WHAT IS CLAIMED IS:

    1.   A composition, comprising:

    a human interleukin-3 mutant polypeptide of the
Formula:

```
Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
1               5                   10                  15

Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                20                  25                  30

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa Xaa
                35                  40                  45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                50                  55                  60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                65                  70                  75

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                80                  85                  90

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                95                  100                 105

Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                110                 115                 120

Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
                125                 130
```
[SEQ ID NO:1]

wherein
Xaa at position 17 is Ser, Lys, Gly, Asp, Met, Gln, or

Arg;

Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
Gln;

Xaa at position 19 is Met, Phe, Ile, Arg, Gly, Ala, or
5   Cys;

Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
Ala;

Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,
Gln, Asn, Thr, Ser or Val;

10   Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, Asp,
Asn, Gln, Leu, Val or Gly;

Xaa at position 23 is Ile, Val, Ala, Leu, Gly, Trp, Lys,
Phe, Leu, Ser, or Arg;

Xaa at position 24 is Ile, Gly, Val, Arg, Ser, Phe, or
15   Leu;

Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
Ala;

Xaa at position 26 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;

20   Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 28 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
Trp;

Xaa at position 29 is Gln, Asn, Leu, Pro, Arg, or Val;

Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
25   Leu, or Lys;

Xaa at position 31 is Pro, Asp, Gly, Ala, Arg, Leu, or
Gln;

Xaa at position 32 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;

30   Xaa at position 33 is Pro, Leu, Gln, Ala, Thr, or Glu;

Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
Thr, Arg, Ala, Phe, Ile or Met;

Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;

35   Xaa at position 36 is Asp, Leu, or Val;

Xaa at position 37 is Phe, Ser, Pro, Trp, or Ile;

Xaa at position 38 is Asn, or Ala;

Xaa at position 40 is Leu, Trp, or Arg;

Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, or
Pro;

5   Xaa at position 42 is Gly, Asp, Ser, Cys, Asn, Lys, Thr,
Leu, Val, Glu, Phe, Tyr, Ile, Met or Ala;

Xaa at position 43 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;

Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,

10   Trp, Glu, Asn, Gln, Ala or Pro;

Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
Lys, Trp, Asp, Asn, Arg, Ser, Ala, Ile, Glu or His;

Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,
Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;

15 Xaa at position 47 is Ile, Gly, Val, Ser, Arg, Pro, or
His;

Xaa at position 48 is Leu, Ser, Cys, Arg, Ile, His, Phe,
Glu, Lys, Thr, Ala, Met, Val or Asn;

Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,

20   or Asp;

Xaa at position 50 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
Ser, Ala, Ile, Val, His, Phe, Met or Gln;

Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;

25 Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
Thr;

Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
Ser, or Met;

Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,

30   Asn, Lys, His, Ala or Leu;

Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;

Xaa at position 57 is Asn or Gly;

35 Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
Cys;

Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;

Xaa at position 60 is Ala, Ser, Pro, Tyr, Asn, or Thr;

Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
        Ser;

5   Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, Asp, or
        Ile;

Xaa at position 63 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
        or Val;

Xaa at position 64 is Ala, Asn, Pro, Ser, or Lys;

10 Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
        Ser;

Xaa at position 66 is Lys, Ile, Arg, Val, Asn, Glu, or
        Ser;

Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,

15   Pro, or His;

Xaa at position 68 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
        or His;

Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
        Gly, or Leu;

20 Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 71 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
        Gln, Trp, or Asn;

Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
        or Asp;

25 Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
        or Arg;

Xaa at position 74 is Ile, Met, Thr, Pro, Arg, Gly, Ala;

Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
        Ser, Gln, or Leu;

30 Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
        Gly, or Asp;

Xaa at position 77 is Ile, Ser, Arg, Thr, or Leu;

Xaa at position 78 is Leu, Ala, Ser, Glu, Phe, Gly, or
        Arg;

35 Xaa at position 79 is Lys, Thr, Asn, Met, Arg, Ile, Gly,
        or Asp;

Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
        or Arg;

Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
        or Lys;

5   Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
        Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;

Xaa at position 83 is Pro, Ala, Thr, Trp, Arg, or Met;

Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;

Xaa at position 85 is Leu, Asn, Val, or Gln;

10 Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;

Xaa at position 87 is Leu, Ser, Trp, or Gly;

Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;

Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
        Asn, or Ser;

15 Xaa at position 90 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
        or Met;

Xaa at position 91 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
        or His;

Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, Ala,
20   Gly, Ile or Leu;

Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
        or Arg;

Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
        Lys, His, Ala, or Pro;

25 Xaa at position 95 is His, Gln, Pro, Arg, Val, Leu, Gly,
        Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile, or Tyr;

Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;

Xaa at position 97 is Ile, Val, Lys, Ala, or Asn;

Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
30   Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;

Xaa at position 99 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
        Gly, Ser, Phe, or His;

Xaa at position 100 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
        Gln, or Pro;

35 Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
        Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu, or Gln;

Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or
       Pro;

Xaa at position 103 is Asp, or Ser;

Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
  5   Leu, Gln, Lys, Ala, Phe, or Gly;

Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
       Tyr, Leu, Lys, Ile, Asp, or His;

Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
       or Pro;

 10   Xaa at position 108 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
       His, Ser, Ala or Pro;

Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
       or Gly;

Xaa at position 110 is Lys, Ala, Asn, Thr, Leu, Arg, Gln,
 15   His, Glu, Ser, Ala, or Trp;

Xaa at position 111 is Leu, Ile, Arg, Asp, or Met;

Xaa at position 112 is Thr, Val, Gln, Tyr, Glu, His, Ser,
       or Phe;

Xaa at position 113 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
 20   Asp, Lys, Leu, Ile, Val or Asn;

Xaa at position 114 is Tyr, Cys, His, Ser, Trp, Arg, or
       Leu;

Xaa at position 115 is Leu, Asn, Val, Pro, Arg, Ala, His,
       Thr, Trp, or Met;

 25   Xaa at position 116 is Lys, Leu, Pro, Thr, Met, Asp, Val,
       Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
       Ile;

Xaa at position 117 is Thr, Ser, Asn, Ile, Trp, Lys, or
       Pro;

 30   Xaa at position 118 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
       or Tyr;

Xaa at position 119 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,
       or Arg;

Xaa at position 120 is Asn, Ala, Pro, Leu, His, Val, or
 35   Gln;

Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,

or Gly;

Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
His, Ile, Tyr, or Cys;

Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,

5   or Leu;

and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids
can be deleted from the N-terminus and/or from 1 to 15

10   amino acids can be deleted from the C-terminus; and wherein
from 4 to 44 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133) human interleukin-3;

15   a colony stimulating factor; and
at least one non-toxic pharmaceutically acceptable
carrier.

         2.   A composition, comprising:

20   a human interleukin-3 mutant polypeptide of the
Formula:

Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
 1   5   10   15

25

Cys Xaa Xaa Xaa Ile Xaa Glu Xaa Xaa Xaa Xaa Leu Lys Xaa Xaa
                20   25   30

Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Asn Leu Asn Xaa Glu Xaa Xaa
30   35   40   45

Xaa Ile Leu Met Xaa Xaa Asn Leu Xaa Xaa Xaa Asn Leu Glu Xaa
                50   55   60

35   Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Ile Glu
                65   70   75

```
    Xaa Xaa Leu Xaa Xaa Leu Xaa Xaa Cys Xaa Pro Xaa Xaa Thr Ala
                    80                  85                  90

 5  Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa Xaa
                    95                  100                 105


    Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu Xaa
                    110                 115                 120
10
    Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe [SEQ ID NO:2]
                    125                 130
```

wherein

15   Xaa at position 17 is Ser, Gly, Asp, Met, or Gln;

Xaa at position 18 is Asn, His, or Ile;

Xaa at position 19 is Met or Ile;

Xaa at position 21 is Asp or Glu;

Xaa at position 23 is Ile, Ala, Leu, or Gly;

20   Xaa at position 24 is Ile, Val, or Leu;

Xaa at position 25 is Thr, His, Gln, or Ala;

Xaa at position 26 is His or Ala;

Xaa at position 29 is Gln, Asn, or Val;

Xaa at position 30 is Pro, Gly, or Gln;

25   Xaa at position 31 is Pro, Asp, Gly, or Gln;

Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
        Glu;

Xaa at position 33 is Pro or Glu;

Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Ala, Arg,

30   Gln, Glu, Ile, Phe, Thr or Met;

Xaa at position 35 is Leu, Ala, Asn, Pro, Gln, or Val;

Xaa at position 37 is Phe, Ser, Pro, or Trp;

Xaa at position 38 is Asn or Ala;

Xaa at position 42 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,

35   Leu, Met, Tyr or Arg;

Xaa at position 44 is Asp or Glu;

Xaa at position 45 is Gln, Val, Met, Leu, Thr, Ala, Asn,
    Glu, Ser or Lys;

Xaa at position 46 is Asp, Phe, Ser, Thr, Ala, Asn Gln,
    Glu, His, Ile, Lys, Tyr, Val or Cys;

5   Xaa at position 50 is Glu, Ala, Asn, Ser or Asp;

Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
    His;

Xaa at position 54 is Arg or Ala;

Xaa at position 55 is Arg, Thr, Val, Leu, or Gly;

10   Xaa at position 56 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,
     Glu, Leu, Thr, Val or Lys;

Xaa at position 60 is Ala or Ser;

Xaa at position 62 is Asn, Pro, Thr, or Ile;

Xaa at position 63 is Arg or Lys;

15   Xaa at position 64 is Ala or Asn;

Xaa at position 65 is Val or Thr;

Xaa at position 66 is Lys or Arg;

Xaa at position 67 is Ser, Phe, or His;

Xaa at position 68 is Leu, Ile, Phe, or His;

20   Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, or
    Gly;

Xaa at position 71 is Ala, Pro, or Arg;

Xaa at position 72 is Ser, Glu, Arg, or Asp;

Xaa at position 73 is Ala or Leu;

25   Xaa at position 76 is Ser, Val, Ala, Asn, Glu, Pro, or
    Gly;

Xaa at position 77 is Ile or Leu;

Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
    Gly, or Asp;

30   Xaa at position 80 is Asn, Gly, Glu, or Arg;

Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
    Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 83 is Pro or Thr;

Xaa at position 85 is Leu or Val;

35   Xaa at position 87 is Leu or Ser;

Xaa at position 88 is Ala or Trp;

Xaa at position 91 is Ala or Pro;

Xaa at position 93 is Thr, Asp, Ser, Pro, Ala, Leu, or
     Arg;

Xaa at position 95 is His, Pro, Arg, Val, Leu, Gly, Asn,
5   Phe, Ser or Thr;

Xaa at position 96 is Pro or Tyr;

Xaa at position 97 is Ile or Val;

Xaa at position 98 is His, Ile, Asn, Leu, Ala, Thr, Leu,
 Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;

10   Xaa at position 99 is Ile, Leu, or Val;

Xaa at position 100 is Lys, Arg, Ile, Gln, Pro, or Ser;

Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Pro,
     Asn, Ile, Leu or Tyr;

Xaa at position 104 is Trp or Leu;

15   Xaa at position 105 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
     Leu, Lys, Ile, Asp, or His;

Xaa at position 106 is Glu or Gly;

Xaa at position 108 is Arg, Ala, or Ser;

Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;

20   Xaa at position 112 is Thr, Val, or Gln;

Xaa at position 114 is Tyr or Trp;

Xaa at position 115 is Leu or Ala;

Xaa at position 116 is Lys, Thr, Val, Trp, Ser, Ala, His,
     Met, Phe, Tyr or Ile;

25   Xaa at position 117 is Thr or Ser;

Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Asp, or
     Gly;

Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
30   His, Ile, Tyr, or Cys;

Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
     or Leu;

and which can additionally have Met- preceding the amino
35   acid in position 1; and wherein from 1 to 14 amino acids
can be deleted from the N-terminus and/or from 1 to 15

amino acids can be deleted from the C-terminus; and wherein
from 4 to 35 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133)human interleukin-3;

5   a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently
referred to as c-mpl ligand), M-CSF, erythropoietin (EPO),
IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-
11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-
10   cell growth factor, B-cell differentiation factor,
eosinophil differentiation factor and stem cell factor
(SCF); and

        at least one non-toxic pharmaceutically acceptable
carrier.
15

        3.   A composition of claim 2, wherein said human
interleukin-3 mutant polypeptide is of the Formula:

     Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
20   1   5   10   15

     Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa Xaa
                     20   25   30

25   Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp Xaa
                     35   40   45

     Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu Ala
                     50   55   60
30
     Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile Glu
                     65   70   75

     Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr Ala
35   80   85   90

Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp Xaa
                    95   100   105

Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu Xaa
5   110   115   120

Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
                    125   130

[SEQ ID NO:3]
10
wherein

Xaa at position 17 is Ser, Gly, Asp, or Gln;

Xaa at position 18 is Asn, His, or Ile;

Xaa at position 23 is Ile, Ala, Leu, or Gly;
15 Xaa at position 25 is Thr, His, or Gln;

Xaa at position 26 is His or Ala;

Xaa at position 29 is Gln or Asn;

Xaa at position 30 is Pro or Gly;

Xaa at position 32 is Leu, Arg, Asn, or Ala;
20 Xaa at position 34 is Leu, Val, Ser, Ala, Arg, Gln, Glu,

        Ile, Phe, Thr, or Met;

Xaa at position 35 is Leu, Ala, Asn, or Pro;

Xaa at position 38 is Asn or Ala;

Xaa at position 42 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,
25   Met, Tyr or Arg;

Xaa at position 45 is Gln, Val, Met, Leu, Ala, Asn, Glu,

        or Lys;

Xaa at position 46 is Asp, Phe, Ser, Gln, Glu, His, Val

        or Thr;
30 Xaa at position 50 is Glu Asn, Ser or Asp;

Xaa at position 51 is Asn, Arg, Pro, Thr, or His;

Xaa at position 55 is Arg, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Ser, Ala, Asn, Val, Leu or

        Gln;
35 Xaa at position 62 is Asn, Pro, or Thr;

Xaa at position 64 is Ala or Asn;

Xaa at position 65 is Val or Thr;

Xaa at position 67 is Ser or Phe;

Xaa at position 68 is Leu or Phe;

Xaa at position 69 is Gln, Ala, Glu, or Arg;

5   Xaa at position 76 is Ser, Val, Asn, Pro, or Gly;

Xaa at position 77 is Ile or Leu;

Xaa at position 79 is Lys, Gly, Asn, Met, Arg, Ile, or
      Gly;

Xaa at position 80 is Asn, Gly, Glu, or Arg;

10   Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
      His, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 87 is Leu or Ser;

Xaa at position 88 is Ala or Trp;

Xaa at position 91 is Ala or Pro;

15   Xaa at position 93 is Thr, Asp, or Ala;

Xaa at position 95 is His, Pro, Arg, Val, Gly, Asn, Ser or
      Thr;

Xaa at position 98 is His, Ile, Asn, Ala, Thr, Gln, Glu,
      Lys, Met, Ser, Tyr, Val or Leu;

20   Xaa at position 99 is Ile or Leu;

Xaa at position 100 is Lys or Arg;

Xaa at position 101 is Asp, Pro, Met, Lys, Thr, His, Pro,
      Asn, Ile, Leu or Tyr;

Xaa at position 105 is Asn, Pro, Ser, Ile or Asp;

25   Xaa at position 108 is Arg, Ala, or Ser;

Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 112 is Thr or Gln;

Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, Tyr
      or Ile;

30   Xaa at position 117 is Thr or Ser;

Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 121 is Ala, Ser, Ile, Pro, or Asp;

Xaa at position 122 is Gln, Met, Trp, Phe, Pro, His, Ile,
      or Tyr;

35   Xaa at position 123 is Ala, Met, Glu, Ser, or Leu;

and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids
can be deleted from the N-terminus and/or from 1 to 15
amino acids can be deleted from the C-terminus; and wherein
5   from 4 to 44 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133)human interleukin-3.

        4.   A composition of claim 3,wherein said human
10   interleukin-3 mutant polypeptide is of the Formula:

Xaa at position 42 is Gly, Asp, Ser, Ile, Leu, Met, Tyr,
        or Ala;
Xaa at position 45 is Gln, Val, Met or Asn;
15   Xaa at position 46 is Asp, Ser, Gln, His or Val;
Xaa at position 50 is Glu or Asp;
Xaa at position 51 is Asn, Pro or Thr;
Xaa at position 62 is Asn or Pro;
Xaa at position 76 is Ser, or Pro;
20   Xaa at position 82 is Leu, Trp, Asp, Asn Glu, His, Phe,
        Ser or Tyr;
Xaa at position 95 is His, Arg, Thr, Asn or Ser;
Xaa at position 98 is His, Ile, Leu, Ala, Gln, Lys, Met,
        Ser, Tyr or Val;
25   Xaa at position 100 is Lys or Arg;
Xaa at position 101 is Asp, Pro, His, Asn, Ile or Leu;
Xaa at position 105 is Asn, or Pro;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, or
30   Tyr;
Xaa at position 121 is Ala, or Ile;
Xaa at position 122 is Gln, or Ile; and
Xaa at position 123 is Ala, Met or Glu.

35   5.   A composition, comprising:
        a human interleukin-3 mutant polypeptide of the

Formula:

```
Asn Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1               5                   10                      15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa
                20                  25                      30

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                35                  40                      45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                50                  55                      60

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                65                  70                      75

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                80                  85                      90

Xaa Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                95                  100                     105

Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:4]
                110
```

wherein

Xaa at position 3 is Ser, Lys, Gly, Asp, Met, Gln, or Arg;

Xaa at position 4 is Asn, His, Leu, Ile, Phe, Arg, or Gln;

Xaa at position 5 is Met, Phe, Ile, Arg, Gly, Ala, or Cys;

Xaa at position 6 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;

Xaa at position 7 is Asp, Phe, Lys, Arg, Ala, Gly, Glu, Gln, Asn, Thr, Ser or Val;

Xaa at position 8 is Glu, Trp, Pro, Ser, Ala, His, Asp, Asn, Gln, Leu, Val, or Gly;

Xaa at position 9 is Ile, Val, Ala, Leu, Gly, Trp, Lys,

Phe, Leu, Ser, or Arg;

Xaa at position 10 is Ile, Gly, Val, Arg, Ser, Phe, or
    Leu;

Xaa at position 11 is Thr, His, Gly, Gln, Arg, Pro, or
5   Ala;

Xaa at position 12 is His, Thr, Phe, Gly, Arg, Ala, or
    Trp;

Xaa at position 13 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 14 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
10   Trp;

Xaa at position 15 is Gln, Asn, Leu, Pro, Arg, or Val;

Xaa at position 16 is Pro, His, Thr, Gly, Asp, Gln, Ser,
    Leu, or Lys;

Xaa at position 17 is Pro, Asp, Gly, Ala, Arg, Leu, or
15   Gln;

Xaa at position 18 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
    or Glu;

Xaa at position 19 is Pro, Leu, Gln, Ala, Thr, or Glu;

Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
20   Thr, Arg, Ala, Phe, Ile or Met;

Xaa at position 21 is Leu, Ala, Gly, Asn, Pro, Gln, or
    Val;

Xaa at position 22 is Asp, Leu, or Val;

Xaa at position 23 is Phe, Ser, Pro, Trp, or Ile;

25 Xaa at position 24 is Asn, or Ala;

Xaa at position 26 is Leu, Trp, or Arg;

Xaa at position 27 is Asn, Cys, Arg, Leu, His, Met, Pro;

Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Lys, Asn,
    Thr, Leu, Val, Glu, Phe, Tyr, Ile or Met;

30 Xaa at position 29 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
    Cys, Gln, Arg, Thr, Gly or Ser;

Xaa at position 30 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
    Trp, Glu, Asn, Gln, Ala or Pro;

Xaa at position 31 is Gln, Pro, Phe, Val, Met, Leu, Thr,
35   Lys, Asp, Asn, Arg, Ser, Ala, Ile, Glu, His or Trp;

Xaa at position 32 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,

Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;

Xaa at position 33 is Ile, Gly, Val, Ser, Arg, Pro, or
    His;

Xaa at position 34 is Leu, Ser, Cys, Arg, Ile, His, Phe,
5   Glu, Lys, Thr, Ala, Met, Val or Asn;

Xaa at position 35 is Met, Arg, Ala, Gly, Pro, Asn, His,
    or Asp;

Xaa at position 36 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
    Ser, Ala, Ile, Val, His, Phe, Met or Gln;

10 Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or
    His;

Xaa at position 38 is Asn, His, Arg, Leu, Gly, Ser, or
    Thr;

Xaa at position 39 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
15   Ser, Met, or;

Xaa at position 40 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
    Asn, Lys, His, Ala or Leu;

Xaa at position 41 is Arg, Thr, Val, Ser, Leu, or Gly;

Xaa at position 42 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
20   His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;

Xaa at position 43 is Asn or Gly;

Xaa at position 44 is Leu, Ser, Asp, Arg, Gln, Val, or
    Cys;

Xaa at position 45 is Glu Tyr, His, Leu, Pro, or Arg;

25 Xaa at position 46 is Ala, Ser, Pro, Tyr, Asn, or Thr;

Xaa at position 47 is Phe, Asn, Glu, Pro, Lys, Arg, or
    Ser;

Xaa at position 48 is Asn, His, Val, Arg, Pro, Thr, Asp,
    or Ile;

30 Xaa at position 49 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
    or Val;

Xaa at position 50 is Ala, Asn, Pro, Ser, or Lys;

Xaa at position 51 is Val, Thr, Pro, His, Leu, Phe, or
    Ser;

35 Xaa at position 52 is Lys, Ile, Arg, Val, Asn, Glu, or
    Ser;

Xaa at position 53 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
Pro, or His;

Xaa at position 54 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
or His;

5 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
Gly, or Leu;

Xaa at position 56 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 57 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
Gln, Trp, or Asn;

10 Xaa at position 58 is Ser, Glu, Met, Ala, His, Asn, Arg,
or Asp;

Xaa at position 59 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
or Arg;

Xaa at position 60 is Ile, Met, Thr, Pro, Arg, Gly, Ala;

15 Xaa at position 61 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
Ser, Gln, or Leu;

Xaa at position 62 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
Gly, or Asp;

Xaa at position 63 is Ile, Ser, Arg, Thr, or Leu;

20 Xaa at position 64 is Leu, Ala, Ser, Glu, Phe, Gly, or
Arg;

Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
or Asp;

Xaa at position 66 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
25 or Arg;

Xaa at position 67 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
or Lys;

Xaa at position 68 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;

30 Xaa at position 69 is Pro, Ala, Thr, Trp, Arg, or Met;

Xaa at position 70 is Cys, Glu, Gly, Arg, Met, or Val;

Xaa at position 71 is Leu, Asn, Val, or Gln;

Xaa at position 72 is Pro, Cys, Arg, Ala, or Lys;

Xaa at position 73 is Leu, Ser, Trp, or Gly;

35 Xaa at position 74 is Ala, Lys, Arg, Val, or Trp;

Xaa at position 75 is Thr, Asp, Cys, Leu, Val, Glu, His,

Asn, or Ser;

Xaa at position 76 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;

Xaa at position 77 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
5   or His;

Xaa at position 78 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;

Xaa at position 79 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;

10 Xaa at position 80 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala or Pro;

Xaa at position 81 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile or Tyr;

Xaa at position 82 is Pro, Lys, Tyr, Gly, Ile, or Thr;

15 Xaa at position 83 is Ile, Val, Lys, Ala, or Asn;

Xaa at position 84 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;

Xaa at position 85 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;

20 Xaa at position 86 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, Pro;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu or Gln;

Xaa at position 88 is Gly, Leu, Glu, Lys, Ser, Tyr, or
25   Pro;

Xaa at position 89 is Asp, or Ser;

Xaa at position 90 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;

Xaa at position 91 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
30   Tyr, Leu, Lys, Ile, Asp, or His;

Xaa at position 92 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
or Pro;

Xaa at position 94 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
His, Ser, Ala, or Pro;

35 Xaa at position 95 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
or Gly;

Xaa at position 96 is Lys, Asn, Thr, Leu, Gln, Arg,
    His, Glu, Ser, Ala or Trp;

Xaa at position 97 is Leu, Ile, Arg, Asp, or Met;

Xaa at position 98 is Thr, Val, Gln, Tyr, Glu, His, Ser,

5   or Phe;

Xaa at position 99 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
    Asp, Lys, Leu, Ile, Val or Asn;

Xaa at position 100 is Tyr, Cys, His, Ser, Trp, Arg, or
    Leu;

10   Xaa at position 101 is Leu, Asn, Val, Pro, Arg, Ala, His,
    Thr, Trp, or Met;

Xaa at position 102 is Lys, Leu, Pro, Thr, Met, Asp, Val,
    Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
    Ile;

15   Xaa at position 103 is Thr, Ser, Asn, Ile, Trp, Lys, or
    Pro;

Xaa at position 104 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
    or Tyr;

Xaa at position 105 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,

20   or Arg;

Xaa at position 106 is Asn, Ala, Pro, Leu, His, Val, or
    Gln;

Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
    or Gly;

25   Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
    His, Ile, Tyr, or Cys;

Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
    or Leu;

30   and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 44 of
the amino acids designated by Xaa are different from the
corresponding native amino acids of (1-133) human
interleukin-3;

35   a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently

referred to as c-mpl ligand), M-CSF, erythropoietin (EPO), IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-cell growth factor, B-cell differentiation factor,

5 eosinophil differentiation factor and stem cell factor (SCF); and

at least one non-toxic pharmaceutically acceptable carrier.

10   6.   A composition of claim 5, wherein said human interleukin-3 mutant polypeptide is of the Formula:

```
Asn Cys Xaa Xaa Xaa Ile Xaa Glu Xaa Xaa Xaa Xaa Leu Lys Xaa
1               5                   10                  15
```

15

```
Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Asn Leu Asn Xaa Glu Xaa
                20                  25                  30
```

```
Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Xaa Xaa Xaa Asn Leu Glu
20              35                  40                  45
```

```
Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Ile
                50                  55                  60
```

```
25  Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Xaa Cys Xaa Pro Xaa Xaa Thr
                65                  70                  75
```

```
Ala Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa
                80                  85                  90
```

30

```
Xaa Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu
                95                  100                 105
```

```
35  Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:5]
                110
```

wherein

Xaa at position 3 is Ser, Gly, Asp, Met, or Gln;

Xaa at position 4 is Asn, His, or Ile;

5   Xaa at position 5 is Met or Ile;

Xaa at position 7 is Asp or Glu;

Xaa at position 9 is Ile, Ala, Leu, or Gly;

Xaa at position 10 is Ile, Val, or Leu;

Xaa at position 11 is Thr, His, Gln, or Ala;

10   Xaa at position 12 is His or Ala;

Xaa at position 15 is Gln, Asn, or Val;

Xaa at position 16 is Pro, Gly, or Gln;

Xaa at position 17 is Pro, Asp, Gly, or Gln;

Xaa at position 18 is Leu, Arg, Gln, Asn, Gly, Ala, or

15   Glu;

Xaa at position 19 is Pro or Glu;

Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Ala, Arg,

        Gln, Glu, Ile, Phe, Thr or Met;

Xaa at position 21 is Leu, Ala, Asn, Pro, Gln, or Val;

20   Xaa at position 23 is Phe, Ser, Pro, or Trp;

Xaa at position 24 is Asn or Ala;

Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,

        Leu, Met Tyr or Arg;

Xaa at position 30 is Asp or Glu;

25   Xaa at position 31 is Gln, Val, Met, Leu, Thr, Ala, Asn,

        Glu, Ser or Lys;

Xaa at position 32 is Asp, Phe, Ser, Thr, Ala, Asn, Gln,

        Glu, His, Ile, Lys, Tyr, Val or Cys;

Xaa at position 36 is Glu, Ala, Asn, Ser or Asp;

30   Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or

        His;

Xaa at position 40 is Arg or Ala;

Xaa at position 41 is Arg, Thr, Val, Leu, or Gly;

Xaa at position 42 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,

35   Glu, Leu, Thr, Val or Lys;

Xaa at position 46 is Ala or Ser;

Xaa at position 48 is Asn, Pro, Thr, or Ile;

Xaa at position 49 is Arg or Lys;

Xaa at position 50 is Ala or Asn;

Xaa at position 51 is Val or Thr;

5   Xaa at position 52 is Lys or Arg;

Xaa at position 53 is Ser, Phe, or His;

Xaa at position 54 is Leu, Ile, Phe, or His;

Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, or
     Gly;

10   Xaa at position 57 is Ala, Pro, or Arg;

Xaa at position 58 is Ser, Glu, Arg, or Asp;

Xaa at position 59 is Ala or Leu;

Xaa at position 62 is Ser, Val, Ala, Asn, Glu, Pro, or
     Gly;

15   Xaa at position 63 is Ile or Leu;

Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
     Gly, or Asp;

Xaa at position 66 is Asn, Gly, Glu, or Arg;

Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,

20   Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 69 is Pro or Thr;

Xaa at position 71 is Leu or Val;

Xaa at position 73 is Leu or Ser;

Xaa at position 74 is Ala or Trp;

25   Xaa at position 77 is Ala or Pro;

Xaa at position 79 is Thr, Asp, Ser, Pro, Ala, Leu, or
     Arg;

Xaa at position 81 is His, Pro, Arg, Val, Leu, Gly, Asn,
     Phe, Ser or Thr;

30   Xaa at position 82 is Pro or Tyr;

Xaa at position 83 is Ile or Val;

Xaa at position 84 is His, Ile, Asn, Leu, Ala, Thr, Leu,
     Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;

Xaa at position 85 is Ile, Leu, or Val;

35   Xaa at position 86 is Lys, Arg, Ile, Gln, Pro, or Ser;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Asn,

Ile, Leu or Tyr;

Xaa at position 90 is Trp or Leu;

Xaa at position 91 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
    Leu, Lys, Ile, Asp, or His;

5 Xaa at position 92 is Glu, or Gly;

Xaa at position 94 is Arg, Ala, or Ser;

Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 98 is Thr, Val, or Gln;

Xaa at position 100 is Tyr or Trp;

10 Xaa at position 101 is Leu or Ala;

Xaa at position 102 is Lys, Thr, Val, Trp, Ser, Ala, His,
    Met, Phe, Tyr or Ile;

Xaa at position 103 is Thr or Ser;

Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

15 Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Asp, or
    Gly;

Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
    His, Ile, Tyr, or Cys;

Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
20   or Leu;

which can additionally have Met- or Met-Ala- preceding the
amino acid in position 1; and wherein from 4 to 35 of the
amino acids designated by Xaa are different from the
25 corresponding amino acids of native human interleukin-3.

    7.   A composition of claim 6, wherein said human
interleukin-3 mutant polypeptide is of the Formula:

30 Asn Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa
    1   5   10   15

    Xaa Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp
                    20   25   30
35

    Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu

```
                            35                    40                    45

     Ala Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile
                            50                    55                    60
  5
     Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr
                            65                    70                    75


     Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp
 10                         80                    85                    90


     Xaa Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu
                            95                   100                   105


 15  Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:6]
                           110
```

wherein

Xaa at position 3 is Ser, Gly, Asp, or Gln;

20 Xaa at position 4 is Asn, His, or Ile;

Xaa at position 9 is Ile, Ala, Leu, or Gly;

Xaa at position 11 is Thr, His, or Gln;

Xaa at position 12 is His or Ala;

Xaa at position 15 is Gln or Asn;

25 Xaa at position 16 is Pro or Gly;

Xaa at position 18 is Leu, Arg, Asn, or Ala;

Xaa at position 20 is Leu, Val, Ser, Ala, Arg, Gln, Glu,
    Ile, Phe, Thr or Met;

Xaa at position 21 is Leu, Ala, Asn, or Pro;

30 Xaa at position 24 is Asn or Ala;

Xaa at position 28 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,
    Met, Tyr or Arg;

Xaa at position 31 is Gln, Val, Met, Leu, Ala, Asn, Glu or
    Lys;

35 Xaa at position 32 is Asp, Phe, Ser, Ala, Gln, Glu, His,
    Val or Thr;

Xaa at position 36 is Glu, Asn, Ser or Asp;

Xaa at position 37 is Asn, Arg, Pro, Thr, or His;

Xaa at position 41 is Arg, Leu, or Gly;

Xaa at position 42 is Pro, Gly, Ser, Ala, Asn, Val, Leu or
5   Gln;

Xaa at position 48 is Asn, Pro, or Thr;

Xaa at position 50 is Ala or Asn;

Xaa at position 51 is Val or Thr;

Xaa at position 53 is Ser or Phe;

10   Xaa at position 54 is Leu or Phe;

Xaa at position 55 is Gln, Ala, Glu, or Arg;

Xaa at position 62 is Ser, Val, Asn, Pro, or Gly;

Xaa at position 63 is Ile or Leu;

Xaa at position 65 is Lys, Asn, Met, Arg, Ile, or Gly;

15   Xaa at position 66 is Asn, Gly, Glu, or Arg;

Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
      His, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 73 is Leu or Ser;

Xaa at position 74 is Ala or Trp;

20   Xaa at position 77 is Ala or Pro;

Xaa at position 79 is Thr, Asp, or Ala;

Xaa at position 81 is His, Pro, Arg, Val, Gly, Asn, Ser or
      Thr;

Xaa at position 84 is His, Ile, Asn, Ala, Thr, Arg, Gln,
25   Glu, Lys, Met, Ser, Tyr, Val or Leu;

Xaa at position 85 is Ile or Leu;

Xaa at position 86 is Lys or Arg;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Pro, Asn,
      Ile, Leu or Tyr;

30   Xaa at position 91 is Asn, Pro, Ser, Ile or Asp;

Xaa at position 94 is Arg, Ala, or Ser;

Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 98 is Thr or Gln;

Xaa at position 102 is Lys, Val, Trp, or Ile;

35   Xaa at position 103 is Thr, Ala, His, Phe, Tyr or Ser;

Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 107 is Ala, Ser, Ile, Pro, or Asp;

Xaa at position 108 is Gln, Met, Trp, Phe, Pro, His, Ile, or Tyr;

Xaa at position 109 is Ala, Met, Glu, Ser, or Leu;

5

and which can additionally have Met- or Met-Ala- preceding the amino acid in position 1; and wherein from 4 to 26 of the amino acids designated by Xaa are different from the corresponding amino acids of native (1-133)human

10   interleukin-3.

        8.   The composition of claim 7, wherein said human interleukin-3 mutant polypeptide is of the Formula:

15

Xaa at position 17 is Ser, Lys, Asp, Met, Gln, or Arg;

Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or Gln;

Xaa at position 19 is Met, Arg, Gly, Ala, or Cys;

20   Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;

Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, or Val;

Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, or

25   Gly;

Xaa at position 23 is Ile, Ala, Gly, Trp, Lys, Leu, Ser, or Arg;

Xaa at position 24 is Ile, Gly, Arg, or Ser;

Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or

30   Ala;

Xaa at position 26 is His, Thr, Phe, Gly, Ala, or Trp;

Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 28 is Lys, Leu, Gln, Gly, Pro, Val or Trp;

Xaa at position 29 is Gln, Asn, Pro, Arg, or Val;

35   Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser, Leu, or Lys;

Xaa at position 31 is Pro, Asp, Gly, Arg, Leu, or Gln;

Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
        Glu;

Xaa at position 33 is Pro, Leu, Gln, Thr, or Glu;

5   Xaa at position 34 is Leu, Gly, Ser, or Lys;

Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, or Gln;

Xaa at position 36 is Asp, Leu, or Val;

Xaa at position 37 is Phe, Ser, or Pro;

Xaa at position 38 is Asn, or Ala;

10   Xaa at position 40 is Leu, Trp, or Arg;

Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, Pro;

Xaa at position 42 is Gly, Asp, Ser, Cys, or Ala;

Xaa at position 42 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
        Cys, or Ser;

15   Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
        Trp, or Pro;

Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
        Lys, or Trp;

Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, or Gly;

20   Xaa at position 47 is Ile, Gly, Ser, Arg, Pro, or His;

Xaa at position 48 is Leu, Ser, Cys, Arg, His, Phe, or
        Asn;

Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
        or Asp;

25   Xaa at position 50 is Glu, Leu, Thr, Asp, or Tyr;

Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
        His;

Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
        Thr;

30   Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
        Ser, or;

Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
        or Leu;

Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;

35   Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, or Lys;

Xaa at position 57 is Asn or Gly;

Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
        Cys;

Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;

Xaa at position 60 is Ala, Ser, Tyr, Asn, or Thr;

5   Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
        Ser;

Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, or Ile;

Xaa at position 63 is Arg, Tyr, Trp, Ser, Pro, or Val;

Xaa at position 64 is Ala, Asn, Ser, or Lys;

10 Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
        Ser;

Xaa at position 66 is Lys, Ile, Val, Asn, Glu, or Ser;

Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
        Pro, or His;

15 Xaa at position 68 is Leu, Val, Trp, Ser, Thr, or His;

Xaa at position 69 is Gln, Ala, Pro, Thr, Arg, Trp, Gly,
        or Leu;

Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 71 is Ala, Met, Leu, Arg, Glu, Thr, Gln,

20   Trp, or Asn;

Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
        or Asp;

Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
        or Arg;

25 Xaa at position 74 is Ile, Thr, Pro, Arg, Gly, Ala;

Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
        Ser, or Leu;

Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
        Gly, or Asp;

30 Xaa at position 77 is Ile, Ser, Arg, or Thr;

Xaa at position 78 is Leu, Ala, Ser, Glu, Gly, or Arg;

Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Ile, or
        Asp;

Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, or

35   Arg;

Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, or

　　　　Lys;

　　Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, or Asp;

　　Xaa at position 83 is Pro, Thr, Trp, Arg, or Met;

　　Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;

5　Xaa at position 85 is Leu, Asn, or Gln;

　　Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;

　　Xaa at position 87 is Leu, Ser, Trp, or Gly;

　　Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;

　　Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,

10　　　　or Asn;

　　Xaa at position 90 is Ala, Ser, Asp, Ile, or Met;

　　Xaa at position 91 is Ala, Ser, Thr, Phe, Leu, Asp, or

　　　　His;

　　Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, or

15　　　　Leu;

　　Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,

　　　　or Arg;

　　Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, or

　　　　Pro;

20　Xaa at position 95 is His, Gln, Pro, Val, Leu, Thr or Tyr;

　　Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;

　　Xaa at position 97 is Ile, Lys, Ala, or Asn;

　　Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,

　　　　or Pro;

25　Xaa at position 99 is Ile, Arg, Asp, Pro, Gln, Gly, Phe,

　　　　or His;

　　Xaa at position 100 is Lys, Tyr, Leu, His, Ile, Ser, Gln,

　　　　or Pro;

　　Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,

30　　　　Tyr, or Gln;

　　Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or

　　　　Pro;

　　Xaa at position 103 is Asp, or Ser;

　　Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,

35　　　　Leu, Gln, Lys, Ala, Phe, or Gly;

　　Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,

Tyr, Leu, Lys, Ile, or His;

Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly, or Pro;

Xaa at position 108 is Arg, Asp, Leu, Thr, Ile, or Pro;

5   Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser, or Gly.

9.   A composition of claim 8, wherein said human interleukin-3 mutant polypeptide is of the Formula:

10

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            1                5                   10
(Met)m-Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr
                15                   20
Ser Trp Val Asn Cys Ser Xaa Xaa Xaa Asp Glu Ile Ile
15  25                  30                   35
Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa
            40                   45                   50
Xaa Asn Leu Asn Xaa Glu Asp Xaa Asp Ile Leu Xaa Glu
                55                   60
20  Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa
        65                   70                   75
Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa
                80                   85
Ile Leu Xaa Asn Leu Xaa Pro Cys Xaa Pro Xaa Xaa Thr
25  90                   95                   100
Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly
            105                  110                  115
Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu
                120                  125
30  Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln Thr Thr Leu
        130
Ser Leu Ala Ile Phe [SEQ ID NO:7]
```

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa
35 at position 19 is Met, Ala or Ile; Xaa at position 20 is
Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa

at position 25 is Thr or His; Xaa at position 29 is Gln,
Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or
Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37
is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa
5   at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at
position 45 is Gln, Val, or Met; Xaa at position 46 is Asp
or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at
position 50 is Glu or Asp; Xaa at position 51 is Asn Arg or
Ser; Xaa at position 55 is Arg, Leu, or Thr; Xaa at
10   position 56 is Pro or Ser; Xaa at position 59 is Glu or
Leu; Xaa at position 60 is Ala or Ser; Xaa at position 62
is Asn, Val or Pro; Xaa at position 63 is Arg or His; Xaa
at position 65 is Val or Ser; Xaa at position 67 is Ser,
Asn, His or Gln; Xaa at position 69 is Gln or Glu; Xaa at
15   position 73 is Ala or Gly; Xaa at position 76 is Ser, Ala
or Pro; Xaa at position 79 is Lys, Arg or Ser; Xaa at
position 82 is Leu, Glu, Val or Trp; Xaa at position 85 is
Leu or Val; Xaa at position 87 is Leu, Ser, Tyr; Xaa at
position 88 is Ala or Trp; Xaa at position 91 is Ala or
20   Pro; Xaa at position 93 is Pro or Ser; Xaa at position 95
is His or Thr; Xaa at position 98 is His, Ile, or Thr; Xaa
at position 100 is Lys or Arg; Xaa at position 101 is Asp,
Ala or Met; Xaa at position 105 is Asn or Glu; Xaa at
position 109 is Arg, Glu or Leu; Xaa at position 112 is Thr
25   or Gln; Xaa at position 116 is Lys, Val, Trp or Ser; Xaa at
position 117 is Thr or Ser; Xaa at position 120 is Asn,
Gln, or His; Xaa at position 123 is Ala or Glu; with the
proviso that from four to forty-four of the amino acids
designated by Xaa are different from the corresponding
30   amino acids of native human interleukin-3.

10.   The composition of claim 9, wherein said
human interleukin-3 mutant polypeptide is of the Formula:

35   1   5   10
$(Met_m-Ala_n)_p$-Asn Cys Ser Xaa Xaa Xaa Asp Glu Xaa Ile

237

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                15                    20
    Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa
        25                    30                    35
    Xaa Asn Leu Asn Xaa Glu Asp Xaa Xaa Ile Leu Xaa Glu
  5
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            40                    45
Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa
50                    55                    60
Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa
5        65                    70                    75
Ile Leu Xaa Asn Xaa Xaa Pro Cys Xaa Pro Xaa Ala Thr
                80                    85
Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly
      90                    95                    100
10  Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu
            105                    110
Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln [SEQ ID NO:8]
```

wherein m is 0 or 1; n is 0 or 1; p is 0 or 1; Xaa at

15   position 4 is Asn or Ile; Xaa at position 5 is Met, Ala or

Ile: Xaa at position 6 is Ile, Pro or Leu; Xaa at position

9 is Ile, Ala or Leu; Xaa at position 11 is Thr or His; Xaa

at position 15 is Gln, Arg, Val or Ile; Xaa at position 18

is Leu, Ala, Asn or Arg; Xaa at position 20 is Leu or Ser;

20   Xaa at position 23 is Phe, Pro, or Ser; Xaa at position 24

is Asn or Ala; Xaa at position 28 is Gly, Ala, Ser, Asp or

Asn; Xaa at position 31 is Gln, Val, or Met; Xaa at

position 32 is Asp or Ser; Xaa at position 35 is Met, Ile

or Asp; Xaa at position 36 is Glu or Asp; Xaa at position

25   37 is Asn, Arg or Ser; Xaa at position 41 is Arg, Leu, or

Thr; Xaa at position 42 is Pro or Ser; Xaa at position 45

is Glu or Leu; Xaa at position 46 is Ala or Ser; Xaa at

position 48 is Asn, Val or Pro; Xaa at position 49 is Arg

or His; Xaa at position 51 is Val or Ser; Xaa at position

30   53 is Ser, Asn, His or Gln; Xaa at position 55 is Gln or

Glu; Xaa at position 59 is Ala or Gly; Xaa at position 62

is Ser, Ala or Pro; Xaa at position 65 is Lys, Arg or Ser;

Xaa at position 67 is Leu, Glu, or Val; Xaa at position 68

is Leu, Glu, Val or Trp; Xaa at position 71 is Leu or Val;

35   Xaa at position 73 is Leu, Ser or Tyr; Xaa at position 74

is Ala or Trp; Xaa at position 77 is Ala or Pro; Xaa at

position 79 is Pro or Ser; Xaa at position 81 is His or
Thr; Xaa at position 84 is His, Ile, or Thr; Xaa at
position 86 is Lys or Arg; Xaa at position 87 is Asp, Ala
or Met; Xaa at position 91 is Asn or Glu; Xaa at position
5   95 is Arg, Glu, Leu; Xaa at position 98 Thr or Gln; Xaa at
position 102 is Lys, Val, Trp or Ser; Xaa at position 103
is Thr or Ser; Xaa at position 106 is Asn, Gln, or His; Xaa
at position 109 is Ala or Glu; with the proviso that from
four to forty-four of the amino acids designated by Xaa are
10   different from the corresponding amino acids of native (15-
125)human interleukin-3.

        11.   The composition of claim 10, wherein said human
interleukin-3 mutant polypeptide is of the Formula:
15

        Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20   Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:9];

25   Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30   Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:10];

        Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35   Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

5　　Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:11];

　　　Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

10　Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:12];

15

　　　Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

20　Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:13];

25　　　Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

30　Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:14];

　　　Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

35　Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

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     Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
  5  Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:15];

         Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
     Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
     Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
 10  Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
     Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:16];
 15
         Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
     Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
     Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
     Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
 20  Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
     Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
     Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
     Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:17];

 25      Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
     Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
     Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
     Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
     Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
 30  Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
     Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
     Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:18];

         Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
 35  Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
     Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
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Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

5   Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:19];

      Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asn Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

10   Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:20];

15

      Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser

20   Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:21];

25   Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

30   Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:22];

      Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

35   Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
5   Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:23];

    Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
10 Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:24];
15

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20 Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:25];

25 Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:26];

    Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
35 Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:27];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:28];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:29];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:30];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

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Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
5   Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:31];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
10   Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:32];
15

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
20   Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:33];

25   Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30   Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:34];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35   Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
5   Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:35];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
10   Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:36];
15

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
20   Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:37];

25   Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
30   Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:38];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35   Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
5   Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:39].

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile
His His Leu Lys Arg Pro Pro Ala Pro Leu Leu Asp
10 Pro Asn Asn Leu Asn Ala Glu Asp Val Asp Ile Leu Met Asp Arg
Asn Leu Arg Leu Ser Asn Leu Glu Ser Phe Val Arg Ala Val Lys
Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:40]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ala Ile His His Leu
Lys Arg Pro Pro Ala Pro Ser Leu Asp Pro Asn Asn Leu Asn Asp
20 Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
25 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:41]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
30 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:42]
35

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

```
      Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Pro Asn
      Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
   5  Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
      Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:43]


      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
  10  Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
      Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
      Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
  15  Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
      Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:44]


      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
  20  Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
      Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
      Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
  25  Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
      Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:45]


      Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
      Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
  30  Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala Glu Asp Val
      Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn Leu Glu Ser
      Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser Gly Ile Glu
      Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
      Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
  35  Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
      Ala Gln Glu Gln Gln [SEQ ID NO:46]and
```

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    Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
    Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
 5  Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser Glu Asp Met
    Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn Leu Leu Ala
    Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser Gly Ile Glu
    Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
    Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
10  Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
    Ala Gln Glu Gln Gln [SEQ ID NO:47].
```

12. The composition of claim 10, wherein said human interleukin-3 mutant polypeptide is of the Formula:

```
    Met Ala Asn Cys Ser Ile Met Ile Asp Glu Leu Ile His His Leu
    Lys Ile Pro Pro Asn Pro Ser Leu Asp Ser Ala Asn Leu Asn Ser
    Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
    Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
20  Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
    Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
    Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
    Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:48].
```

25

13. The composition of claim 1-12 wherein said CSF is selected from the group consisting of G-CSF , Meg-CSF and GM-CSF:

14. A method of increasing multi-lineage
30 hematopoietic cell production in a mammal in need thereof comprising administering a pharmaceutically effective amount of a human interleukin-3 mutant polypeptide of the Formula:

```
35  Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
    1               5               10               15
```

```
       Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                    20                  25                  30


  5    Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa Xaa
                    35                  40                  45


       Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                    50                  55                  60
 10
       Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                    65                  70                  75


       Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 15                 80                  85                  90


       Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                    95                  100                 105


 20    Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                    110                 115                 120


       Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
                    125                 130
 25    [SEQ IDNO:15]
```

wherein

Xaa at position 17 is Ser, Lys, Gly, Asp, Met, Gln, or
    Arg;
30 Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
    Gln;
Xaa at position 19 is Met, Phe, Ile, Arg, Gly, Ala, or
    Cys;
Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
35 Ala;
Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,

Gln, Asn, Thr, Ser or Val;

Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, Asp, Asn, Gln, Leu, Val or Gly;

Xaa at position 23 is Ile, Val, Ala, Leu, Gly, Trp, Lys,

5   Phe, Leu, Ser, or Arg;

Xaa at position 24 is Ile, Gly, Val, Arg, Ser, Phe, or Leu;

Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or Ala;

10   Xaa at position 26 is His, Thr, Phe, Gly, Arg, Ala, or Trp;

Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 28 is Lys, Arg, Leu, Gln, Gly, Pro, Val or Trp;

15   Xaa at position 29 is Gln, Asn, Leu, Pro, Arg, or Val;

Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser, Leu, or Lys;

Xaa at position 31 is Pro, Asp, Gly, Ala, Arg, Leu, or Gln;

20   Xaa at position 32 is Leu, Val, Arg, Gln, Asn, Gly, Ala, or Glu;

Xaa at position 33 is Pro, Leu, Gln, Ala, Thr, or Glu;

Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Glu, Gln, Thr, Arg, Ala, Phe, Ile or Met;

25   Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, Gln, or Val;

Xaa at position 36 is Asp, Leu, or Val;

Xaa at position 37 is Phe, Ser, Pro, Trp, or Ile;

Xaa at position 38 is Asn, or Ala;

30   Xaa at position 40 is Leu, Trp, or Arg;

Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, or Pro;

Xaa at position 42 is Gly, Asp, Ser, Cys, Asn, Lys, Thr, Leu, Val, Glu, Phe, Tyr, Ile, Met or Ala;

35   Xaa at position 43 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala, Cys, Gln, Arg, Thr, Gly or Ser;

Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
        Trp, Glu, Asn, Gln, Ala or Pro;

Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
        Lys, Trp, Asp, Asn, Arg, Ser, Ala, Ile, Glu or His;

5   Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,
        Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;

Xaa at position 47 is Ile, Gly, Val, Ser, Arg, Pro, or
        His;

Xaa at position 48 is Leu, Ser, Cys, Arg, Ile, His, Phe,
10   Glu, Lys, Thr, Ala, Met, Val or Asn;

Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
        or Asp;

Xaa at position 50 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn,
        Ser, Ala, Ile, Val, His, Phe, Met or Gln;

15 Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
        His;

Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
        Thr;

Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
20   Ser, or Met;

Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
        Asn, Lys, His, Ala or Leu;

Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
25   His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;

Xaa at position 57 is Asn or Gly;

Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
        Cys;

Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;

30 Xaa at position 60 is Ala, Ser, Pro, Tyr, Asn, or Thr;

Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
        Ser;

Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, Asp, or
        Ile;

35 Xaa at position 63 is Arg, Tyr, Trp, Lys, Ser, His, Pro,
        or Val;

Xaa at position 64 is Ala, Asn, Pro, Ser, or Lys;

Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
   Ser;

Xaa at position 66 is Lys, Ile, Arg, Val, Asn, Glu, or
 5   Ser;

Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
   Pro, or His;

Xaa at position 68 is Leu, Val, Trp, Ser, Ile, Phe, Thr,
   or His;

10 Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, Trp,
   Gly, or Leu;

Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 71 is Ala, Met, Leu, Pro, Arg, Glu, Thr,
   Gln, Trp, or Asn;

15 Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
   or Asp;

Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
   or Arg;

Xaa at position 74 is Ile, Met, Thr, Pro, Arg, Gly, Ala;

20 Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
   Ser, Gln, or Leu;

Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
   Gly, or Asp;

Xaa at position 77 is Ile, Ser, Arg, Thr, or Leu;

25 Xaa at position 78 is Leu, Ala, Ser, Glu, Phe, Gly, or
   Arg;

Xaa at position 79 is Lys, Thr, Asn, Met, Arg, Ile, Gly,
   or Asp;

Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, Glu,
30   or Arg;

Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, Val,
   or Lys;

Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, Asp, Glu,
   Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;

35 Xaa at position 83 is Pro, Ala, Thr, Trp, Arg, or Met;

Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;

Xaa at position 85 is Leu, Asn, Val, or Gln;

Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;

Xaa at position 87 is Leu, Ser, Trp, or Gly;

Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;

5   Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,
Asn, or Ser;

Xaa at position 90 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;

Xaa at position 91 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
10   or His;

Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;

Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;

15   Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala, or Pro;

Xaa at position 95 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile, or Tyr;

Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;

20   Xaa at position 97 is Ile, Val, Lys, Ala, or Asn;

Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;

Xaa at position 99 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;

25   Xaa at position 100 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, or Pro;

Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu, or Gln;

Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or
30   Pro;

Xaa at position 103 is Asp, or Ser;

Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;

Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
35   Tyr, Leu, Lys, Ile, Asp, or His;

Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,

or Pro;

Xaa at position 108 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
   His, Ser, Ala or Pro;

Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
 5   or Gly;

Xaa at position 110 is Lys, Ala, Asn, Thr, Leu, Arg, Gln,
   His, Glu, Ser, Ala, or Trp;

Xaa at position 111 is Leu, Ile, Arg, Asp, or Met;

Xaa at position 112 is Thr, Val, Gln, Tyr, Glu, His, Ser,
10   or Phe;

Xaa at position 113 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
   Asp, Lys, Leu, Ile, Val or Asn;

Xaa at position 114 is Tyr, Cys, His, Ser, Trp, Arg, or
   Leu;

15 Xaa at position 115 is Leu, Asn, Val, Pro, Arg, Ala, His,
   Thr, Trp, or Met;

Xaa at position 116 is Lys, Leu, Pro, Thr, Met, Asp, Val,
   Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
   Ile;

20 Xaa at position 117 is Thr, Ser, Asn, Ile, Trp, Lys, or
   Pro;

Xaa at position 118 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
   or Tyr;

Xaa at position 119 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,
25   or Arg;

Xaa at position 120 is Asn, Ala, Pro, Leu, His, Val, or
   Gln;

Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
   or Gly;

30 Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
   His, Ile, Tyr, or Cys;

Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
   or Leu;

35 and which can additionally have Met- preceding the amino
   acid in position 1; and wherein from 1 to 14 amino acids

can be deleted from the N-terminus and/or from 1 to 15
amino acids can be deleted from the C-terminus; and wherein
from 4 to 44 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
5   133) human interleukin-3; and

a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently
referred to as c-mpl ligand), M-CSF, erythropoietin (EPO),
IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-
10   11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-
cell growth factor, B-cell differentiation factor,
eosinophil differentiation factor and stem cell factor
(SCF).

15   15.   A method of increasing multi-lineage
hematopoietic cell production in a mammal in need thereof
comprising administering a pharmaceutically effective
amount of human interleukin-3 mutant polypeptide of the
Formula:
20

Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
  1   5   10   15

Cys Xaa Xaa Xaa Ile Xaa Glu Xaa Xaa Xaa Xaa Leu Lys Xaa Xaa
25   20   25   30

Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Asn Leu Asn Xaa Glu Xaa Xaa
                  35   40   45

30   Xaa Ile Leu Met Xaa Xaa Asn Leu Xaa Xaa Xaa Asn Leu Glu Xaa
                  50   55   60

Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Ile Glu
                  65   70   75
35

Xaa Xaa Leu Xaa Xaa Leu Xaa Xaa Cys Xaa Pro Xaa Xaa Thr Ala

```
                      80                    85                    90

    Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa Xaa
                      95                   100                   105
5
    Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu Xaa
                     110                   115                   120


    Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
10                   125                   130
    [SEQ ID NO:2]


    wherein
    Xaa at position 17 is Ser, Gly, Asp, Met, or Gln;
15  Xaa at position 18 is Asn, His, or Ile;
    Xaa at position 19 is Met or Ile;
    Xaa at position 21 is Asp or Glu;
    Xaa at position 23 is Ile, Ala, Leu, or Gly;
    Xaa at position 24 is Ile, Val, or Leu;
20  Xaa at position 25 is Thr, His, Gln, or Ala;
    Xaa at position 26 is His or Ala;
    Xaa at position 29 is Gln, Asn, or Val;
    Xaa at position 30 is Pro, Gly, or Gln;
    Xaa at position 31 is Pro, Asp, Gly, or Gln;
25  Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
           Glu;
    Xaa at position 33 is Pro or Glu;
    Xaa at position 34 is Leu, Val, Gly, Ser, Lys, Ala, Arg,
           Gln, Glu, Ile, Phe, Thr or Met;
30  Xaa at position 35 is Leu, Ala, Asn, Pro, Gln, or Val;
    Xaa at position 37 is Phe, Ser, Pro, or Trp;
    Xaa at position 38 is Asn or Ala;
    Xaa at position 42 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,
           Leu, Met, Tyr or Arg;
35  Xaa at position 44 is Asp or Glu;
    Xaa at position 45 is Gln, Val, Met, Leu, Thr, Ala, Asn,
```

Glu, Ser or Lys;

Xaa at position 46 is Asp, Phe, Ser, Thr, Ala, Asn Gln,
Glu, His, Ile, Lys, Tyr, Val or Cys;

Xaa at position 50 is Glu, Ala, Asn, Ser or Asp;

5   Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
His;

Xaa at position 54 is Arg or Ala;

Xaa at position 55 is Arg, Thr, Val, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,

10   Glu, Leu, Thr, Val or Lys;

Xaa at position 60 is Ala or Ser;

Xaa at position 62 is Asn, Pro, Thr, or Ile;

Xaa at position 63 is Arg or Lys;

Xaa at position 64 is Ala or Asn;

15   Xaa at position 65 is Val or Thr;

Xaa at position 66 is Lys or Arg;

Xaa at position 67 is Ser, Phe, or His;

Xaa at position 68 is Leu, Ile, Phe, or His;

Xaa at position 69 is Gln, Ala, Pro, Thr, Glu, Arg, or

20   Gly;

Xaa at position 71 is Ala, Pro, or Arg;   ·

Xaa at position 72 is Ser, Glu, Arg, or Asp;

Xaa at position 73 is Ala or Leu;

Xaa at position 76 is Ser, Val, Ala, Asn, Glu, Pro, or

25   Gly;

Xaa at position 77 is Ile or Leu;

Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Arg, Ile,
Gly, or Asp;

Xaa at position 80 is Asn, Gly, Glu, or Arg;

30   Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,
Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 83 is Pro or Thr;

Xaa at position 85 is Leu or Val;

Xaa at position 87 is Leu or Ser;

35   Xaa at position 88 is Ala or Trp;

Xaa at position 91 is Ala or Pro;

Xaa at position 93 is Thr, Asp, Ser, Pro, Ala, Leu, or
    Arg;

Xaa at position 95 is His, Pro, Arg, Val, Leu, Gly, Asn,
    Phe, Ser or Thr;

5   Xaa at position 96 is Pro or Tyr;

Xaa at position 97 is Ile or Val;

Xaa at position 98 is His, Ile, Asn, Leu, Ala, Thr, Leu,
    Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;

Xaa at position 99 is Ile, Leu, or Val;

10 Xaa at position 100 is Lys, Arg, Ile, Gln, Pro, or Ser;

Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Pro,
    Asn, Ile, Leu or Tyr;

Xaa at position 104 is Trp or Leu;

Xaa at position 105 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,
15   Leu, Lys, Ile, Asp, or His;

Xaa at position 106 is Glu or Gly;

Xaa at position 108 is Arg, Ala, or Ser;

Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 112 is Thr, Val, or Gln;

20 Xaa at position 114 is Tyr or Trp;

Xaa at position 115 is Leu or Ala;

Xaa at position 116 is Lys, Thr, Val, Trp, Ser, Ala, His,
    Met, Phe, Tyr or Ile;

Xaa at position 117 is Thr or Ser;

25 Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 121 is Ala, Ser, Ile, Asn, Pro, Asp, or
    Gly;

Xaa at position 122 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
    His, Ile, Tyr, or Cys;

30 Xaa at position 123 is Ala, Met, Glu, His, Ser, Pro, Tyr,
    or Leu;

and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids
35 can be deleted from the N-terminus and/or from 1 to 15
amino acids can be deleted from the C-terminus; and wherein

from 4 to 35 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133)human interleukin-3; and

5   A pharmaceutically effective amount of a colony stimulating
factor.

16.   The method of claim 15, wherein said human
interleukin-3 mutant polypeptide is of the Formula:

10

Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr Ser Trp Val Asn
    1   5   10   15

Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa Xaa
15   20   25   30

Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp Xaa
                    35   40   45

20 Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu Ala
                    50   55   60

Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile Glu
                    65   70   75
25

Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr Ala
                    80   85   90

Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp Xaa
30   95   100   105

Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu Xaa
                    110   115   120

35 Xaa Xaa Xaa Gln Gln Thr Thr Leu Ser Leu Ala Ile Phe
                    125   130

[SEQ ID NO:3]

wherein

Xaa at position 17 is Ser, Gly, Asp, or Gln;

Xaa at position 18 is Asn, His, or Ile;

5   Xaa at position 23 is Ile, Ala, Leu, or Gly;

Xaa at position 25 is Thr, His, or Gln;

Xaa at position 26 is His or Ala;

Xaa at position 29 is Gln or Asn;

Xaa at position 30 is Pro or Gly;

10   Xaa at position 32 is Leu, Arg, Asn, or Ala;

Xaa at position 34 is Leu, Val, Ser, Ala, Arg, Gln, Glu,

        Ile, Phe, Thr, or Met;

Xaa at position 35 is Leu, Ala, Asn, or Pro;

Xaa at position 38 is Asn or Ala;

15   Xaa at position 42 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,

        Met, Tyr or Arg;

Xaa at position 45 is Gln, Val, Met, Leu, Ala, Asn, Glu,

        or Lys;

Xaa at position 46 is Asp, Phe, Ser, Gln, Glu, His, Val

20   or Thr;

Xaa at position 50 is Glu Asn, Ser or Asp;

Xaa at position 51 is Asn, Arg, Pro, Thr, or His;

Xaa at position 55 is Arg, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Ser, Ala, Asn, Val, Leu or

25   Gln;

Xaa at position 62 is Asn, Pro, or Thr;

Xaa at position 64 is Ala or Asn;

Xaa at position 65 is Val or Thr;

Xaa at position 67 is Ser or Phe;

30   Xaa at position 68 is Leu or Phe;

Xaa at position 69 is Gln, Ala, Glu, or Arg;

Xaa at position 76 is Ser, Val, Asn, Pro, or Gly;

Xaa at position 77 is Ile or Leu;

Xaa at position 79 is Lys, Gly, Asn, Met, Arg, Ile, or

35   Gly;

Xaa at position 80 is Asn, Gly, Glu, or Arg;

Xaa at position 82 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
        His, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 87 is Leu or Ser;

Xaa at position 88 is Ala or Trp;

5   Xaa at position 91 is Ala or Pro;

Xaa at position 93 is Thr, Asp, or Ala;

Xaa at position 95 is His, Pro, Arg, Val, Gly, Asn, Ser or
        Thr;

Xaa at position 98 is His, Ile, Asn, Ala, Thr, Gln, Glu,

10   Lys, Met, Ser, Tyr, Val or Leu;

Xaa at position 99 is Ile or Leu;

Xaa at position 100 is Lys or Arg;

Xaa at position 101 is Asp, Pro, Met, Lys, Thr, His, Pro,
        Asn, Ile, Leu or Tyr;

15   Xaa at position 105 is Asn, Pro, Ser, Ile or Asp;

Xaa at position 108 is Arg, Ala, or Ser;

Xaa at position 109 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 112 is Thr or Gln;

Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, Tyr

20   or Ile;

Xaa at position 117 is Thr or Ser;

Xaa at position 120 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 121 is Ala, Ser, Ile, Pro, or Asp;

Xaa at position 122 is Gln, Met, Trp, Phe, Pro, His, Ile,

25   or Tyr;

Xaa at position 123 is Ala, Met, Glu, Ser, or Leu;

and which can additionally have Met- preceding the amino
acid in position 1; and wherein from 1 to 14 amino acids

30   can be deleted from the N-terminus and/or from 1 to 15
amino acids can be deleted from the C-terminus; and wherein
from 4 to 44 of the amino acids designated by Xaa are
different from the corresponding amino acids of native (1-
133)human interleukin-3: and

35   a colony stimulating factor selected from the group
consisting of GM-CSF, CSF-1, G-CSF, Meg-CSF (more recently

referred to as c-mpl ligand), M-CSF, erythropoietin (EPO),
IL-1, IL-4, IL-2, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-
11, IL-12, IL-13, LIF, flt3/flk2, human growth hormone, B-
cell growth factor, B-cell differentiation factor,
5   eosinophil differentiation factor and stem cell factor
(SCF).

17.   The method of claim 16,wherein said human
interleukin-3 mutant polypeptide is of the Formula:
10
Xaa at position 42 is Gly, Asp, Ser, Ile, Leu, Met, Tyr,
       or Ala;
Xaa at position 45 is Gln, Val, Met or Asn;
Xaa at position 46 is Asp, Ser, Gln, His or Val;
15   Xaa at position 50 is Glu or Asp;
Xaa at position 51 is Asn, Pro or Thr;
Xaa at position 62 is Asn or Pro;
Xaa at position 76 is Ser, or Pro;
Xaa at position 82 is Leu, Trp, Asp, Asn Glu, His, Phe,
20   Ser or Tyr;
Xaa at position 95 is His, Arg, Thr, Asn or Ser;
Xaa at position 98 is His, Ile, Leu, Ala, Gln, Lys, Met,
       Ser, Tyr or Val;
Xaa at position 100 is Lys or Arg;
25   Xaa at position 101 is Asp, Pro, His, Asn, Ile or Leu;
Xaa at position 105 is Asn, or Pro;
Xaa at position 108 is Arg, Ala, or Ser;
Xaa at position 116 is Lys, Val, Trp, Ala, His, Phe, or
       Tyr;
30   Xaa at position 121 is Ala, or Ile;
Xaa at position 122 is Gln, or Ile; and
Xaa at position 123 is Ala, Met or Glu.

18. A method of increasing multi-lineage hematopoietic cell
35   production in a mammal in need thereof comprising administering a
pharmaceutically effective amount of a human interleukin-3 mutant

polypeptide of the Formula:

```
Asn Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1               5                   10                      15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa
                20                  25                      30


Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                35                  40                      45


Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                50                  55                      60


Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                65                  70                      75


Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                80                  85                      90

Xaa Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
                95                  100                     105


Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:4]
                110
```

wherein
Xaa at position 3 is Ser, Lys, Gly, Asp, Met, Gln, or Arg;
Xaa at position 4 is Asn, His, Leu, Ile, Phe, Arg, or Gln;
Xaa at position 5 is Met, Phe, Ile, Arg, Gly, Ala, or Cys;
Xaa at position 6 is Ile, Cys, Gln, Glu, Arg, Pro, or Ala;
Xaa at position 7 is Asp, Phe, Lys, Arg, Ala, Gly, Glu,
      Gln, Asn, Thr, Ser or Val;
Xaa at position 8 is Glu, Trp, Pro, Ser, Ala, His, Asp,
      Asn, Gln, Leu, Val, or Gly;
Xaa at position 9 is Ile, Val, Ala, Leu, Gly, Trp, Lys,

Phe, Leu, Ser, or Arg;

Xaa at position 10 is Ile, Gly, Val, Arg, Ser, Phe, or
Leu;

Xaa at position 11 is Thr, His, Gly, Gln, Arg, Pro, or
5   Ala;

Xaa at position 12 is His, Thr, Phe, Gly, Arg, Ala, or
Trp;

Xaa at position 13 is Leu, Gly, Arg, Thr, Ser, or Ala;

Xaa at position 14 is Lys, Arg, Leu, Gln, Gly, Pro, Val or
10   Trp;

Xaa at position 15 is Gln, Asn, Leu, Pro, Arg, or Val;

Xaa at position 16 is Pro, His, Thr, Gly, Asp, Gln, Ser,
Leu, or Lys;

Xaa at position 17 is Pro, Asp, Gly, Ala, Arg, Leu, or
15   Gln;

Xaa at position 18 is Leu, Val, Arg, Gln, Asn, Gly, Ala,
or Glu;

Xaa at position 19 is Pro, Leu, Gln, Ala, Thr, or Glu;

Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Glu, Gln,
20   Thr, Arg, Ala, Phe, Ile or Met;

Xaa at position 21 is Leu, Ala, Gly, Asn, Pro, Gln, or
Val;

Xaa at position 22 is Asp, Leu, or Val;

Xaa at position 23 is Phe, Ser, Pro, Trp, or Ile;

25 Xaa at position 24 is Asn, or Ala;

Xaa at position 26 is Leu, Trp, or Arg;

Xaa at position 27 is Asn, Cys, Arg, Leu, His, Met, Pro;

Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Lys, Asn,
Thr, Leu, Val, Glu, Phe, Tyr, Ile or Met;

30 Xaa at position 29 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
Cys, Gln, Arg, Thr, Gly or Ser;

Xaa at position 30 is Asp, Ser, Leu, Arg, Lys, Thr,Met,
Trp, Glu, Asn, Gln, Ala or Pro;

Xaa at position 31 is Gln, Pro, Phe, Val, Met, Leu, Thr,
35   Lys, Asp, Asn, Arg, Ser, Ala, Ile, Glu, His or Trp;

Xaa at position 32 is Asp, Phe, Ser, Thr, Cys, Glu, Asn,

Gln, Lys, His, Ala, Tyr, Ile, Val or Gly;

Xaa at position 33 is Ile, Gly, Val, Ser, Arg, Pro, or His;

Xaa at position 34 is Leu, Ser, Cys, Arg, Ile, His, Phe,
5   Glu, Lys, Thr, Ala, Met, Val or Asn;

Xaa at position 35 is Met, Arg, Ala, Gly, Pro, Asn, His, or Asp;

Xaa at position 36 is Glu, Leu, Thr, Asp, Tyr, Lys, Asn, Ser, Ala, Ile, Val, His, Phe, Met or Gln;

10   Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or His;

Xaa at position 38 is Asn, His, Arg, Leu, Gly, Ser, or Thr;

Xaa at position 39 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
15   Ser, Met, or;

Xaa at position 40 is Arg, Asp, Ile, Ser, Val, Thr, Gln, Asn, Lys, His, Ala or Leu;

Xaa at position 41 is Arg, Thr, Val, Ser, Leu, or Gly;

Xaa at position 42 is Pro, Gly, Cys, Ser, Gln, Glu, Arg,
20   His, Thr, Ala, Tyr, Phe, Leu, Val or Lys;

Xaa at position 43 is Asn or Gly;

Xaa at position 44 is Leu, Ser, Asp, Arg, Gln, Val, or Cys;

Xaa at position 45 is Glu Tyr, His, Leu, Pro, or Arg;

25   Xaa at position 46 is Ala, Ser, Pro, Tyr, Asn, or Thr;

Xaa at position 47 is Phe, Asn, Glu, Pro, Lys, Arg, or Ser;

Xaa at position 48 is Asn, His, Val, Arg, Pro, Thr, Asp, or Ile;

30   Xaa at position 49 is Arg, Tyr, Trp, Lys, Ser, His, Pro, or Val;

Xaa at position 50 is Ala, Asn, Pro, Ser, or Lys;

Xaa at position 51 is Val, Thr, Pro, His, Leu, Phe, or Ser;

35   Xaa at position 52 is Lys, Ile, Arg, Val, Asn, Glu, or Ser;

Xaa at position 53 is Ser, Ala, Phe, Val, Gly, Asn, Ile, Pro, or His;

Xaa at position 54 is Leu, Val, Trp, Ser, Ile, Phe, Thr, or His;

5 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, Trp, Gly, or Leu;

Xaa at position 56 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 57 is Ala, Met, Leu, Pro, Arg, Glu, Thr, Gln, Trp, or Asn;

10 Xaa at position 58 is Ser, Glu, Met, Ala, His, Asn, Arg, or Asp;

Xaa at position 59 is Ala, Glu, Asp, Leu, Ser, Gly, Thr, or Arg;

Xaa at position 60 is Ile, Met, Thr, Pro, Arg, Gly, Ala;

15 Xaa at position 61 is Glu, Lys, Gly, Asp, Pro, Trp, Arg, Ser, Gln, or Leu;

Xaa at position 62 is Ser, Val, Ala, Asn, Trp, Glu, Pro, Gly, or Asp;

Xaa at position 63 is Ile, Ser, Arg, Thr, or Leu;

20 Xaa at position 64 is Leu, Ala, Ser, Glu, Phe, Gly, or Arg;

Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile, or Asp;

Xaa at position 66 is Asn, Trp, Val, Gly, Thr, Leu, Glu, 25 or Arg;

Xaa at position 67 is Leu, Gln, Gly, Ala, Trp, Arg, Val, or Lys;

Xaa at position 68 is Leu, Gln, Lys, Trp, Arg, Asp, Glu, Asn, His, Thr, Ser, Ala, Tyr, Phe, Ile, Met or Val;

30 Xaa at position 69 is Pro, Ala, Thr, Trp, Arg, or Met;

Xaa at position 70 is Cys, Glu, Gly, Arg, Met, or Val;

Xaa at position 71 is Leu, Asn, Val, or Gln;

Xaa at position 72 is Pro, Cys, Arg, Ala, or Lys;

Xaa at position 73 is Leu, Ser, Trp, or Gly;

35 Xaa at position 74 is Ala, Lys, Arg, Val, or Trp;

Xaa at position 75 is Thr, Asp, Cys, Leu, Val, Glu, His,

Asn, or Ser;

Xaa at position 76 is Ala, Pro, Ser, Thr, Gly, Asp, Ile,
or Met;

Xaa at position 77 is Ala, Pro, Ser, Thr, Phe, Leu, Asp,
5   or His;

Xaa at position 78 is Pro, Phe, Arg, Ser, Lys, His, Ala,
Gly, Ile or Leu;

Xaa at position 79 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
or Arg;

10   Xaa at position 80 is Arg, Ile, Ser, Glu, Leu, Val, Gln,
Lys, His, Ala or Pro;

Xaa at position 81 is His, Gln, Pro, Arg, Val, Leu, Gly,
Thr, Asn, Lys, Ser, Ala, Trp, Phe, Ile or Tyr;

Xaa at position 82 is Pro, Lys, Tyr, Gly, Ile, or Thr;

15   Xaa at position 83 is Ile, Val, Lys, Ala, or Asn;

Xaa at position 84 is His, Ile, Asn, Leu, Asp, Ala, Thr,
Glu, Gln, Ser, Phe, Met, Val, Lys, Arg, Tyr or Pro;

Xaa at position 85 is Ile, Leu, Arg, Asp, Val, Pro, Gln,
Gly, Ser, Phe, or His;

20   Xaa at position 86 is Lys, Tyr, Leu, His, Arg, Ile, Ser,
Gln, Pro;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Val,
Tyr, Glu, Asn, Ser, Ala, Gly, Ile, Leu or Gln;

Xaa at position 88 is Gly, Leu, Glu, Lys, Ser, Tyr, or
25   Pro;

Xaa at position 89 is Asp, or Ser;

Xaa at position 90 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
Leu, Gln, Lys, Ala, Phe, or Gly;

Xaa at position 91 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
30   Tyr, Leu, Lys, Ile, Asp, or His;

Xaa at position 92 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
or Pro;

Xaa at position 94 is Arg, Lys, Asp, Leu, Thr, Ile, Gln,
His, Ser, Ala, or Pro;

35   Xaa at position 95 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
or Gly;

Xaa at position 96 is Lys, Asn, Thr, Leu, Gln, Arg,
      His, Glu, Ser, Ala or Trp;

Xaa at position 97 is Leu, Ile, Arg, Asp, or Met;

Xaa at position 98 is Thr, Val, Gln, Tyr, Glu, His, Ser,

5   or Phe;

Xaa at position 99 is Phe, Ser, Cys, His, Gly, Trp, Tyr,
      Asp, Lys, Leu, Ile, Val or Asn;

Xaa at position 100 is Tyr, Cys, His, Ser, Trp, Arg, or
      Leu;

10   Xaa at position 101 is Leu, Asn, Val, Pro, Arg, Ala, His,
      Thr, Trp, or Met;

Xaa at position 102 is Lys, Leu, Pro, Thr, Met, Asp, Val,
      Glu, Arg, Trp, Ser, Asn, His, Ala, Tyr, Phe, Gln, or
      Ile;

15   Xaa at position 103 is Thr, Ser, Asn, Ile, Trp, Lys, or
      Pro;

Xaa at position 104 is Leu, Ser, Pro, Ala, Glu, Cys, Asp,
      or Tyr;

Xaa at position 105 is Glu, Ser, Lys, Pro, Leu, Thr, Tyr,

20   or Arg;

Xaa at position 106 is Asn, Ala, Pro, Leu, His, Val, or
      Gln;

Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Lys, Asp,
      or Gly;

25   Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
      His, Ile, Tyr, or Cys;

Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
      or Leu;

30   and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 44 of
the amino acids designated by Xaa are different from the
corresponding native amino acids of (1-133) human
interleukin-3; and

35   A pharmaceutically effective amount of a colony
stimulating factor.

19. The method of claim 18, wherein said human interleukin-3 mutant polypeptide is of the Formula:

```
5    Asn Cys Xaa Xaa Xaa Ile Xaa Glu Xaa Xaa Xaa Xaa Leu Lys Xaa
     1                 5                   10                  15


     Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Asn Leu Asn Xaa Glu Xaa
                     20                  25                  30
10
     Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Xaa Xaa Xaa Asn Leu Glu
                     35                  40                  45


     Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Xaa Xaa Ile
15                   50                  55                  60


     Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Xaa Cys Xaa Pro Xaa Xaa Thr
                     65                  70                  75


20   Ala Xaa Pro Xaa Arg Xaa Xaa Xaa Xaa Xaa Xaa Xaa Gly Asp Xaa
                     80                  85                  90


     Xaa Xaa Phe Xaa Xaa Lys Leu Xaa Phe Xaa Xaa Xaa Xaa Leu Glu
                     95                  100                 105
25
     Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:5]
                     110
```

wherein
30   Xaa at position 3 is Ser, Gly, Asp, Met, or Gln;
     Xaa at position 4 is Asn, His, or Ile;
     Xaa at position 5 is Met or Ile;
     Xaa at position 7 is Asp or Glu;
     Xaa at position 9 is Ile, Ala, Leu, or Gly;
35   Xaa at position 10 is Ile, Val, or Leu;
     Xaa at position 11 is Thr, His, Gln, or Ala;

Xaa at position 12 is His or Ala;

Xaa at position 15 is Gln, Asn, or Val;

Xaa at position 16 is Pro, Gly, or Gln;

Xaa at position 17 is Pro, Asp, Gly, or Gln;

5 Xaa at position 18 is Leu, Arg, Gln, Asn, Gly, Ala, or
       Glu;

Xaa at position 19 is Pro or Glu;

Xaa at position 20 is Leu, Val, Gly, Ser, Lys, Ala, Arg,
       Gln, Glu, Ile, Phe, Thr or Met;

10 Xaa at position 21 is Leu, Ala, Asn, Pro, Gln, or Val;

Xaa at position 23 is Phe, Ser, Pro, or Trp;

Xaa at position 24 is Asn or Ala;

Xaa at position 28 is Gly, Asp, Ser, Cys, Ala, Asn, Ile,
       Leu, Met Tyr or Arg;

15 Xaa at position 30 is Asp or Glu;

Xaa at position 31 is Gln, Val, Met, Leu, Thr, Ala, Asn,
       Glu, Ser or Lys;

Xaa at position 32 is Asp, Phe, Ser, Thr, Ala, Asn, Gln,
       Glu, His, Ile, Lys, Tyr, Val or Cys;

20 Xaa at position 36 is Glu, Ala, Asn, Ser or Asp;

Xaa at position 37 is Asn, Arg, Met, Pro, Ser, Thr, or
       His;

Xaa at position 40 is Arg or Ala;

Xaa at position 41 is Arg, Thr, Val, Leu, or Gly;

25 Xaa at position 42 is Pro, Gly, Ser, Gln, Ala, Arg, Asn,
       Glu, Leu, Thr, Val or Lys;

Xaa at position 46 is Ala or Ser;

Xaa at position 48 is Asn, Pro, Thr, or Ile;

Xaa at position 49 is Arg or Lys;

30 Xaa at position 50 is Ala or Asn;

Xaa at position 51 is Val or Thr;

Xaa at position 52 is Lys or Arg;

Xaa at position 53 is Ser, Phe, or His;

Xaa at position 54 is Leu, Ile, Phe, or His;

35 Xaa at position 55 is Gln, Ala, Pro, Thr, Glu, Arg, or
       Gly;

Xaa at position 57 is Ala, Pro, or Arg;

Xaa at position 58 is Ser, Glu, Arg, or Asp;

Xaa at position 59 is Ala or Leu;

Xaa at position 62 is Ser, Val, Ala, Asn, Glu, Pro, or

5   Gly;

Xaa at position 63 is Ile or Leu;

Xaa at position 65 is Lys, Thr, Gly, Asn, Met, Arg, Ile,

     Gly, or Asp;

Xaa at position 66 is Asn, Gly, Glu, or Arg;

10   Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Ala, Asn,

      Glu, His, Ile, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 69 is Pro or Thr;

Xaa at position 71 is Leu or Val;

Xaa at position 73 is Leu or Ser;

15   Xaa at position 74 is Ala or Trp;

Xaa at position 77 is Ala or Pro;

Xaa at position 79 is Thr, Asp, Ser, Pro, Ala, Leu, or

      Arg;

Xaa at position 81 is His, Pro, Arg, Val, Leu, Gly, Asn,

20   Phe, Ser or Thr;

Xaa at position 82 is Pro or Tyr;

Xaa at position 83 is Ile or Val;

Xaa at position 84 is His, Ile, Asn, Leu, Ala, Thr, Leu,

     Arg, Gln, Leu, Lys, Met, Ser, Tyr, Val or Pro;

25   Xaa at position 85 is Ile, Leu, or Val;

Xaa at position 86 is Lys, Arg, Ile, Gln, Pro, or Ser;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Thr, Asn,

     Ile, Leu or Tyr;

Xaa at position 90 is Trp or Leu;

30   Xaa at position 91 is Asn, Pro, Ala, Ser, Trp, Gln, Tyr,

      Leu, Lys, Ile, Asp, or His;

Xaa at position 92 is Glu, or Gly;

Xaa at position 94 is Arg, Ala, or Ser;

Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;

35   Xaa at position 98 is Thr, Val, or Gln;

Xaa at position 100 is Tyr or Trp;

Xaa at position 101 is Leu or Ala;

Xaa at position 102 is Lys, Thr, Val, Trp, Ser, Ala, His,
        Met, Phe, Tyr or Ile;

Xaa at position 103 is Thr or Ser;

5   Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 107 is Ala, Ser, Ile, Asn, Pro, Asp, or
        Gly;

Xaa at position 108 is Gln, Ser, Met, Trp, Arg, Phe, Pro,
        His, Ile, Tyr, or Cys;

10 Xaa at position 109 is Ala, Met, Glu, His, Ser, Pro, Tyr,
        or Leu;

which can additionally have Met- or Met-Ala- preceding the
amino acid in position 1; and wherein from 4 to 35 of the
15 amino acids designated by Xaa are different from the
corresponding amino acids of native human interleukin-3.

        20. The method of claim 19, wherein said human
interleukin-3 mutant polypeptide is of the Formula:
20

Asn Cys Xaa Xaa Met Ile Asp Glu Xaa Ile Xaa Xaa Leu Lys Xaa
1   5   10   15

Xaa Pro Xaa Pro Xaa Xaa Asp Phe Xaa Asn Leu Asn Xaa Glu Asp
25   20   25   30

Xaa Xaa Ile Leu Met Xaa Xaa Asn Leu Arg Xaa Xaa Asn Leu Glu
                35   40   45

30 Ala Phe Xaa Arg Xaa Xaa Lys Xaa Xaa Xaa Asn Ala Ser Ala Ile
                50   55   60

Glu Xaa Xaa Leu Xaa Xaa Leu Xaa Pro Cys Leu Pro Xaa Xaa Thr
                65   70   75
35

Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Xaa Xaa Xaa Gly Asp Trp

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<pre>
                        80   85   90
    Xaa Glu Phe Xaa Xaa Lys Leu Xaa Phe Tyr Leu Xaa Xaa Leu Glu
                        95   100   105
 5
    Xaa Xaa Xaa Xaa Gln Gln [SEQ ID NO:6]
                        110
</pre>

wherein

Xaa at position 3 is Ser, Gly, Asp, or Gln;

10   Xaa at position 4 is Asn, His, or Ile;

Xaa at position 9 is Ile, Ala, Leu, or Gly;

Xaa at position 11 is Thr, His, or Gln;

Xaa at position 12 is His or Ala;

Xaa at position 15 is Gln or Asn;

15   Xaa at position 16 is Pro or Gly;

Xaa at position 18 is Leu, Arg, Asn, or Ala;

Xaa at position 20 is Leu, Val, Ser, Ala, Arg, Gln, Glu,
        Ile, Phe, Thr or Met;

Xaa at position 21 is Leu, Ala, Asn, or Pro;

20   Xaa at position 24 is Asn or Ala;

Xaa at position 28 is Gly, Asp, Ser, Ala, Asn, Ile, Leu,
        Met, Tyr or Arg;

Xaa at position 31 is Gln, Val, Met, Leu, Ala, Asn, Glu or
        Lys;

25   Xaa at position 32 is Asp, Phe, Ser, Ala, Gln, Glu, His,
        Val or Thr;

Xaa at position 36 is Glu, Asn, Ser or Asp;

Xaa at position 37 is Asn, Arg, Pro, Thr, or His;

Xaa at position 41 is Arg, Leu, or Gly;

30   Xaa at position 42 is Pro, Gly, Ser, Ala, Asn, Val, Leu or
        Gln;

Xaa at position 48 is Asn, Pro, or Thr;

Xaa at position 50 is Ala or Asn;

Xaa at position 51 is Val or Thr;

35   Xaa at position 53 is Ser or Phe;

Xaa at position 54 is Leu or Phe;

Xaa at position 55 is Gln, Ala, Glu, or Arg;

Xaa at position 62 is Ser, Val, Asn, Pro, or Gly;

Xaa at position 63 is Ile or Leu;

Xaa at position 65 is Lys, Asn, Met, Arg, Ile, or Gly;

5 Xaa at position 66 is Asn, Gly, Glu, or Arg;

Xaa at position 68 is Leu, Gln, Trp, Arg, Asp, Asn, Glu,
       His, Met, Phe, Ser, Thr, Tyr or Val;

Xaa at position 73 is Leu or Ser;

Xaa at position 74 is Ala or Trp;

10 Xaa at position 77 is Ala or Pro;

Xaa at position 79 is Thr, Asp, or Ala;

Xaa at position 81 is His, Pro, Arg, Val, Gly, Asn, Ser or
       Thr;

Xaa at position 84 is His, Ile, Asn, Ala, Thr, Arg, Gln,

15   Glu, Lys, Met, Ser, Tyr, Val or Leu;

Xaa at position 85 is Ile or Leu;

Xaa at position 86 is Lys or Arg;

Xaa at position 87 is Asp, Pro, Met, Lys, His, Pro, Asn,
       Ile, Leu or Tyr;

20 Xaa at position 91 is Asn, Pro, Ser, Ile or Asp;

Xaa at position 94 is Arg, Ala, or Ser;

Xaa at position 95 is Arg, Thr, Glu, Leu, or Ser;

Xaa at position 98 is Thr or Gln;

Xaa at position 102 is Lys, Val, Trp, or Ile;

25 Xaa at position 103 is Thr, Ala, His, Phe, Tyr or Ser;

Xaa at position 106 is Asn, Pro, Leu, His, Val, or Gln;

Xaa at position 107 is Ala, Ser, Ile, Pro, or Asp;

Xaa at position 108 is Gln, Met, Trp, Phe, Pro, His, Ile,
       or Tyr;

30 Xaa at position 109 is Ala, Met, Glu, Ser, or Leu;

and which can additionally have Met- or Met-Ala- preceding
the amino acid in position 1; and wherein from 4 to 26 of
the amino acids designated by Xaa are different from the
35 corresponding amino acids of native (1-133)human
interleukin-3.

21. The method of claim 20, wherein said human interleukin-3 mutant polypeptide is of the Formula:

5 Xaa at position 17 is Ser, Lys, Asp, Met, Gln, or Arg;
   Xaa at position 18 is Asn, His, Leu, Ile, Phe, Arg, or
      Gln;
   Xaa at position 19 is Met, Arg, Gly, Ala, or Cys;
   Xaa at position 20 is Ile, Cys, Gln, Glu, Arg, Pro, or
10   Ala;
   Xaa at position 21 is Asp, Phe, Lys, Arg, Ala, Gly, or
      Val;
   Xaa at position 22 is Glu, Trp, Pro, Ser, Ala, His, or
      Gly;
15 Xaa at position 23 is Ile, Ala, Gly, Trp, Lys, Leu, Ser,
      or Arg;
   Xaa at position 24 is Ile, Gly, Arg, or Ser;
   Xaa at position 25 is Thr, His, Gly, Gln, Arg, Pro, or
      Ala;
20 Xaa at position 26 is His, Thr, Phe, Gly, Ala, or Trp;
   Xaa at position 27 is Leu, Gly, Arg, Thr, Ser, or Ala;
   Xaa at position 28 is Lys, Leu, Gln, Gly, Pro, Val or Trp;
   Xaa at position 29 is Gln, Asn, Pro, Arg, or Val;
   Xaa at position 30 is Pro, His, Thr, Gly, Asp, Gln, Ser,
25   Leu, or Lys;
   Xaa at position 31 is Pro, Asp, Gly, Arg, Leu, or Gln;
   Xaa at position 32 is Leu, Arg, Gln, Asn, Gly, Ala, or
      Glu;
   Xaa at position 33 is Pro, Leu, Gln, Thr, or Glu;
30 Xaa at position 34 is Leu, Gly, Ser, or Lys;
   Xaa at position 35 is Leu, Ala, Gly, Asn, Pro, or Gln;
   Xaa at position 36 is Asp, Leu, or Val;
   Xaa at position 37 is Phe, Ser, or Pro;
   Xaa at position 38 is Asn, or Ala;
35 Xaa at position 40 is Leu, Trp, or Arg;
   Xaa at position 41 is Asn, Cys, Arg, Leu, His, Met, Pro;

Xaa at position 42 is Gly, Asp, Ser, Cys, or Ala;

Xaa at position 42 is Glu, Asn, Tyr, Leu, Phe, Asp, Ala,
    Cys, or Ser;

Xaa at position 44 is Asp, Ser, Leu, Arg, Lys, Thr, Met,
5   Trp, or Pro;

Xaa at position 45 is Gln, Pro, Phe, Val, Met, Leu, Thr,
    Lys, or Trp;

Xaa at position 46 is Asp, Phe, Ser, Thr, Cys, or Gly;

Xaa at position 47 is Ile, Gly, Ser, Arg, Pro, or His;

10   Xaa at position 48 is Leu, Ser, Cys, Arg, His, Phe, or
    Asn;

Xaa at position 49 is Met, Arg, Ala, Gly, Pro, Asn, His,
    or Asp;

Xaa at position 50 is Glu, Leu, Thr, Asp, or Tyr;

15   Xaa at position 51 is Asn, Arg, Met, Pro, Ser, Thr, or
    His;

Xaa at position 52 is Asn, His, Arg, Leu, Gly, Ser, or
    Thr;

Xaa at position 53 is Leu, Thr, Ala, Gly, Glu, Pro, Lys,
20   Ser, or;

Xaa at position 54 is Arg, Asp, Ile, Ser, Val, Thr, Gln,
    or Leu;

Xaa at position 55 is Arg, Thr, Val, Ser, Leu, or Gly;

Xaa at position 56 is Pro, Gly, Cys, Ser, Gln, or Lys;

25   Xaa at position 57 is Asn or Gly;

Xaa at position 58 is Leu, Ser, Asp, Arg, Gln, Val, or
    Cys;

Xaa at position 59 is Glu Tyr, His, Leu, Pro, or Arg;

Xaa at position 60 is Ala, Ser, Tyr, Asn, or Thr;

30   Xaa at position 61 is Phe, Asn, Glu, Pro, Lys, Arg, or
    Ser;

Xaa at position 62 is Asn His, Val, Arg, Pro, Thr, or Ile;

Xaa at position 63 is Arg, Tyr, Trp, Ser, Pro, or Val;

Xaa at position 64 is Ala, Asn, Ser, or Lys;

35   Xaa at position 65 is Val, Thr, Pro, His, Leu, Phe, or
    Ser;

Xaa at position 66 is Lys, Ile, Val, Asn, Glu, or Ser;

Xaa at position 67 is Ser, Ala, Phe, Val, Gly, Asn, Ile,
        Pro, or His;

Xaa at position 68 is Leu, Val, Trp, Ser, Thr, or His;

5   Xaa at position 69 is Gln, Ala, Pro, Thr, Arg, Trp, Gly,
        or Leu;

Xaa at position 70 is Asn, Leu, Val, Trp, Pro, or Ala;

Xaa at position 71 is Ala, Met, Leu, Arg, Glu, Thr, Gln,
        Trp, or Asn;

10   Xaa at position 72 is Ser, Glu, Met, Ala, His, Asn, Arg,
        or Asp;

Xaa at position 73 is Ala, Glu, Asp, Leu, Ser, Gly, Thr,
        or Arg;

Xaa at position 74 is Ile, Thr, Pro, Arg, Gly, Ala;

15   Xaa at position 75 is Glu, Lys, Gly, Asp, Pro, Trp, Arg,
        Ser, or Leu;

Xaa at position 76 is Ser, Val, Ala, Asn, Trp, Glu, Pro,
        Gly, or Asp;

Xaa at position 77 is Ile, Ser, Arg, or Thr;

20   Xaa at position 78 is Leu, Ala, Ser, Glu, Gly, or Arg;

Xaa at position 79 is Lys, Thr, Gly, Asn, Met, Ile, or
        Asp;

Xaa at position 80 is Asn, Trp, Val, Gly, Thr, Leu, or
        Arg;

25   Xaa at position 81 is Leu, Gln, Gly, Ala, Trp, Arg, or
        Lys;

Xaa at position 82 is Leu, Gln, Lys, Trp, Arg, or Asp;

Xaa at position 83 is Pro, Thr, Trp, Arg, or Met;

Xaa at position 84 is Cys, Glu, Gly, Arg, Met, or Val;

30   Xaa at position 85 is Leu, Asn, or Gln;

Xaa at position 86 is Pro, Cys, Arg, Ala, or Lys;

Xaa at position 87 is Leu, Ser, Trp, or Gly;

Xaa at position 88 is Ala, Lys, Arg, Val, or Trp;

Xaa at position 89 is Thr, Asp, Cys, Leu, Val, Glu, His,

35   or Asn;

Xaa at position 90 is Ala, Ser, Asp, Ile, or Met;

Xaa at position 91 is Ala, Ser, Thr, Phe, Leu, Asp, or
    His;

Xaa at position 92 is Pro, Phe, Arg, Ser, Lys, His, or
    Leu;

5   Xaa at position 93 is Thr, Asp, Ser, Asn, Pro, Ala, Leu,
    or Arg;

Xaa at position 94 is Arg, Ile, Ser, Glu, Leu, Val, or
    Pro;

Xaa at position 95 is His, Gln, Pro, Val, Leu, Thr or Tyr;

10 Xaa at position 96 is Pro, Lys, Tyr, Gly, Ile, or Thr;

Xaa at position 97 is Ile, Lys, Ala, or Asn;

Xaa at position 98 is His, Ile, Asn, Leu, Asp, Ala, Thr,
    or Pro;

Xaa at position 99 is Ile, Arg, Asp, Pro, Gln, Gly, Phe,

15   or His;

Xaa at position 100 is Lys, Tyr, Leu, His, Ile, Ser, Gln,
    or Pro;

Xaa at position 101 is Asp, Pro, Met, Lys, His, Thr, Val,
    Tyr, or Gln;

20 Xaa at position 102 is Gly, Leu, Glu, Lys, Ser, Tyr, or
    Pro;

Xaa at position 103 is Asp, or Ser;

Xaa at position 104 is Trp, Val, Cys, Tyr, Thr, Met, Pro,
    Leu, Gln, Lys, Ala, Phe, or Gly;

25 Xaa at position 105 is Asn, Pro, Ala, Phe, Ser, Trp, Gln,
    Tyr, Leu, Lys, Ile, or His;

Xaa at position 106 is Glu, Ser, Ala, Lys, Thr, Ile, Gly,
    or Pro;

Xaa at position 108 is Arg, Asp, Leu, Thr, Ile, or Pro;

30 Xaa at position 109 is Arg, Thr, Pro, Glu, Tyr, Leu, Ser,
    or Gly.

22. The method of claim 19 wherein said human interleukin-3 mutant polypeptide is of the Formula:

```
          1              5                  10
5  (Met)m-Ala Pro Met Thr Gln Thr Thr Ser Leu Lys Thr
              15                  20
   Ser Trp Val Asn Cys Ser Xaa Xaa Xaa Asp Glu Ile Ile
   25                  30                  35
   Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa
10         40                  45                  50
   Xaa Asn Leu Asn Xaa Glu Asp Xaa Asp Ile Leu Xaa Glu
                  55                  60
   Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa
         65                  70                  75
15 Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa
              80                  85
   Ile Leu Xaa Asn Leu Xaa Pro Cys Xaa Pro Xaa Xaa Thr
   90                  95                  100
   Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly
20         105                 110                 115
   Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu
                  120                 125
   Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln Thr Thr Leu
         130
25 Ser Leu Ala Ile Phe [SEQ ID NO:7]
```

wherein m is 0 or 1; Xaa at position 18 is Asn or Ile; Xaa at position 19 is Met, Ala or Ile; Xaa at position 20 is Ile, Pro or Ile; Xaa at position 23 is Ile, Ala or Leu; Xaa at position 25 is Thr or His; Xaa at position 29 is Gln, Arg, Val or Ile; Xaa at position 32 is Leu, Ala, Asn or Arg; Xaa at position 34 is Leu or Ser; Xaa at position 37 is Phe, Pro, or Ser; Xaa at position 38 is Asn or Ala; Xaa at position 42 is Gly, Ala, Ser, Asp or Asn; Xaa at position 45 is Gln, Val, or Met; Xaa at position 46 is Asp or Ser; Xaa at position 49 is Met, Ile, Leu or Asp; Xaa at

position 50 is Glu or Asp; Xaa at position 51 is Asn Arg or
Ser; Xaa at position 55 is Arg, Leu, or Thr; Xaa at
position 56 is Pro or Ser; Xaa at position 59 is Glu or
Leu; Xaa at position 60 is Ala or Ser; Xaa at position 62
5   is Asn, Val or Pro; Xaa at position 63 is Arg or His; Xaa
at position 65 is Val or Ser; Xaa at position 67 is Ser,
Asn, His or Gln; Xaa at position 69 is Gln or Glu; Xaa at
position 73 is Ala or Gly; Xaa at position 76 is Ser, Ala
or Pro; Xaa at position 79 is Lys, Arg or Ser; Xaa at
10   position 82 is Leu, Glu, Val or Trp; Xaa at position 85 is
Leu or Val; Xaa at position 87 is Leu, Ser, Tyr; Xaa at
position 88 is Ala or Trp; Xaa at position 91 is Ala or
Pro; Xaa at position 93 is Pro or Ser; Xaa at position 95
is His or Thr; Xaa at position 98 is His, Ile, or Thr; Xaa
15   at position 100 is Lys or Arg; Xaa at position 101 is Asp,
Ala or Met; Xaa at position 105 is Asn or Glu; Xaa at
position 109 is Arg, Glu or Leu; Xaa at position 112 is Thr
or Gln; Xaa at position 116 is Lys, Val, Trp or Ser; Xaa at
position 117 is Thr or Ser; Xaa at position 120 is Asn,
20   Gln, or His; Xaa at position 123 is Ala or Glu; with the
proviso that from four to forty-four of the amino acids
designated by Xaa are different from the corresponding
amino acids of native human interleukin-3.

25   23.   The method of claim 21 wherein said human
interleukin-3 mutant polypeptide is of the Formula:

                    1   5   10
     (Met$_m$-Ala$_n$)$_p$-Asn Cys Ser Xaa Xaa Xaa Asp Glu Xaa Ile
30   15   20
     Xaa His Leu Lys Xaa Pro Pro Xaa Pro Xaa Leu Asp Xaa
          25   30   35
     Xaa Asn Leu Asn Xaa Glu Asp Xaa Xaa Ile Leu Xaa Glu

```
                40                   45
     Xaa Asn Leu Arg Xaa Xaa Asn Leu Xaa Xaa Phe Xaa Xaa
     50                  55                   60
     Ala Xaa Lys Xaa Leu Xaa Asn Ala Ser Xaa Ile Glu Xaa
5            65                  70                   75
     Ile Leu Xaa Asn Xaa Xaa Pro Cys Xaa Pro Xaa Ala Thr
                     80                  85
     Ala Xaa Pro Xaa Arg Xaa Pro Ile Xaa Ile Xaa Xaa Gly
         90                  95                   100
10   Asp Trp Xaa Glu Phe Arg Xaa Lys Leu Xaa Phe Tyr Leu
                105                 110
     Xaa Xaa Leu Glu Xaa Ala Gln Xaa Gln Gln [SEQ ID NO:8]
```

wherein m is 0 or 1; n is 0 or 1; p is 0 or 1; Xaa at
position 4 is Asn or Ile; Xaa at position 5 is Met, Ala or
Ile: Xaa at position 6 is Ile, Pro or Leu; Xaa at position
9 is Ile, Ala or Leu; Xaa at position 11 is Thr or His; Xaa
at position 15 is Gln, Arg, Val or Ile; Xaa at position 18
is Leu, Ala, Asn or Arg; Xaa at position 20 is Leu or Ser;
Xaa at position 23 is Phe, Pro, or Ser; Xaa at position 24
is Asn or Ala; Xaa at position 28 is Gly, Ala, Ser, Asp or
Asn; Xaa at position 31 is Gln, Val, or Met; Xaa at
position 32 is Asp or Ser; Xaa at position 35 is Met, Ile
or Asp; Xaa at position 36 is Glu or Asp; Xaa at position
37 is Asn, Arg or Ser; Xaa at position 41 is Arg, Leu, or
Thr; Xaa at position 42 is Pro or Ser; Xaa at position 45
is Glu or Leu; Xaa at position 46 is Ala or Ser; Xaa at
position 48 is Asn, Val or Pro; Xaa at position 49 is Arg
or His; Xaa at position 51 is Val or Ser; Xaa at position
53 is Ser, Asn, His or Gln; Xaa at position 55 is Gln or
Glu; Xaa at position 59 is Ala or Gly; Xaa at position 62
is Ser, Ala or Pro; Xaa at position 65 is Lys, Arg or Ser;
Xaa at position 67 is Leu, Glu, or Val; Xaa at position 68
is Leu, Glu, Val or Trp; Xaa at position 71 is Leu or Val;
Xaa at position 73 is Leu, Ser or Tyr; Xaa at position 74
is Ala or Trp; Xaa at position 77 is Ala or Pro; Xaa at

position 79 is Pro or Ser; Xaa at position 81 is His or
Thr; Xaa at position 84 is His, Ile, or Thr; Xaa at
position 86 is Lys or Arg; Xaa at position 87 is Asp, Ala
or Met; Xaa at position 91 is Asn or Glu; Xaa at position
5   95 is Arg, Glu, Leu; Xaa at position 98 Thr or Gln; Xaa at
position 102 is Lys, Val, Trp or Ser; Xaa at position 103
is Thr or Ser; Xaa at position 106 is Asn, Gln, or His; Xaa
at position 109 is Ala or Glu; with the proviso that from
four to forty-four of the amino acids designated by Xaa are
10   different from the corresponding amino acids of native (15-
125)human interleukin-3.

        24.   The method of claim 22 wherein said human
interleukin-3 mutant polypeptide is of the Formula:
15

        Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
Glu Asp Val Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
20   Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:9];

25   Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
30   Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:10];

        Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
35   Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
Glu Asp Met Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala
Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu Ala
Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly Asp
5   Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr Leu
Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:11];

     Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
10   Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
15   Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:12];

     Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
20   Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:13];

25
     Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
30   Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:14];

35   Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
5   Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:15];

    Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
10 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
Asp Trp Gln Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
15 Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:16];

    Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
20 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
Asp Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:17];
25

    Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
30 Ala
Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu Ala
Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly Asp
Trp Asn Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser Leu
Glu His Ala Gln Glu Gln Gln Gln [SEQ ID NO:18];
35

    Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

```
    Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
    Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
    Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
    Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
  5 Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
    Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
    Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:19];


      Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
 10 Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
    Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
    Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
    Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
    Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
 15 Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
    Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:20];


      Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu
    Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly
 20 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn
    Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser
    Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
    Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
    Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
 25 Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:21];


      Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
    Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
    Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
 30 Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
    Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu
    Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly
    Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr
    Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:22];
 35
      Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
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Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser

Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

5 Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:23];

    Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

10 Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser

Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

15 Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:24];

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

20 Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser

Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

25 Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:25];

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

30 Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser

Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:26];

35

Met Ala Asn Cys Ser Asn Met Ile Asp Glu Ile Ile Thr His Leu

Lys Gln Pro Pro Leu Pro Leu Leu Asp Phe Asn Asn Leu Asn Gly

Glu Asp Gln Asp Ile Leu Met Glu Asn Asn Leu Arg Arg Pro Asn

Leu Glu Ala Phe Asn Arg Ala Val Lys Ser Leu Gln Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser

5   Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser

Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:27];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

10   Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

15   Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:28];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser

20   Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn

Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

25   Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:29];

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser

Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

30   Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Ala Ile Glu Ser Ile Leu Lys Asn Leu Leu Pro Cys Leu Pro Leu

Ala Thr Ala Ala Pro Thr Arg His Pro Ile His Ile Lys Asp Gly

Asp Trp Asn Glu Phe Arg Arg Lys Leu Thr Phe Tyr Leu Lys Thr

Leu Glu Asn Ala Gln Ala Gln Gln [SEQ ID NO:30];

35

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

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     Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
     Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
     Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
  5  Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
     Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:31];


     Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
 10  Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
     Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
     Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
 15  Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
     Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:32];


     Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
     Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
 20  Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
     Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
 25  Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:33];


     Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
     Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala
     Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
 30  Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
     Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:34];
 35

     Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
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      Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
      Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
      Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
   5  Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
      Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
      Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:35];


      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
  10  Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
      Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
      Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
  15  Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
      Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:36];


      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
      Lys Val Pro Pro Ala Pro Leu Leu Asp Ser Asn Asn Leu Asn Ser
  20  Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
      Leu Leu Ala Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
      Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser
  25  Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:37];


      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
      Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
      Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
  30  Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
      Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser
      Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly
      Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
      Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:38];

  35
      Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
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Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

Glu Asp Val Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Val Pro Cys Leu Pro Ser

5   Ala Thr Ala Ala Pro Ser Arg His Pro Ile Thr Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Ser

Leu Glu His Ala Gln Glu Gln Gln [SEQ ID NO:39].

10   Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Ser Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser

15   Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:40]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ala Ile His His Leu

20   Lys Arg Pro Pro Ala Pro Ser Leu Asp Pro Asn Asn Leu Asn Asp

Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser

Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly

25   Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:41]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp

30   Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn

Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser

Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser

Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly

Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr

35   Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:42]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu

Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala

Glu Asp Val Asp Ile Leu Met Asp Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
5   Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:43]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
10   Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
15   Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:44]

Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
20   Lys Arg Pro Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Asp
Glu Asp Met Ser Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn
Leu Glu Ser Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser
Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
25   Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:45]

Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
30   Pro Ala Pro Leu Leu Asp Pro Asn Asn Leu Asn Ala Glu Asp Val
Asp Ile Leu Met Glu Arg Asn Leu Arg Leu Pro Asn Leu Glu Ser
Phe Val Arg Ala Val Lys Asn Leu Glu Asn Ala Ser Gly Ile Glu
Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
35   Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
Ala Gln Glu Gln Gln [SEQ ID NO:46]

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     Met Ala Tyr Pro Glu Thr Asp Tyr Lys Asp Asp Asp Asp Lys Asn
     Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu Lys Arg Pro
  5  Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser Glu Asp Met
     Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn Leu Leu Ala
     Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser Gly Ile Glu
     Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser Ala Thr Ala
     Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly Asp Trp Gln
 10  Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr Leu Glu Gln
     Ala Gln Glu Gln Gln [SEQ ID NO:47] and

     Met Ala Asn Cys Ser Ile Met Ile Asp Glu Leu Ile His His Leu
     Lys Ile Pro Pro Asn Pro Ser Leu Asp Ser Ala Asn Leu Asn Ser
 15  Glu Asp Val Ser Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
     Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
     Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
 20  Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:48].
```

       25.   The method of claim 23 wherein said human
interleukin-3 mutant polypeptide is of the Formula:

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 25  Met Ala Asn Cys Ser Ile Met Ile Asp Glu Ile Ile His His Leu
     Lys Arg Pro Pro Asn Pro Leu Leu Asp Pro Asn Asn Leu Asn Ser
     Glu Asp Met Asp Ile Leu Met Glu Arg Asn Leu Arg Thr Pro Asn
     Leu Leu Ala Phe Val Arg Ala Val Lys His Leu Glu Asn Ala Ser
     Gly Ile Glu Ala Ile Leu Arg Asn Leu Gln Pro Cys Leu Pro Ser
 30  Ala Thr Ala Ala Pro Ser Arg His Pro Ile Ile Ile Lys Ala Gly
     Asp Trp Gln Glu Phe Arg Glu Lys Leu Thr Phe Tyr Leu Val Thr
     Leu Glu Gln Ala Gln Glu Gln Gln [SEQ ID NO:32].
```

       26.   The method as recited in claim
 35 14,15,16,17,18,19,20,21,22,23,24 or 25 wherein said colony
stimulating factor is selected from the group consisting of
GM-CSF, G-CSF, and Meg-CSF.